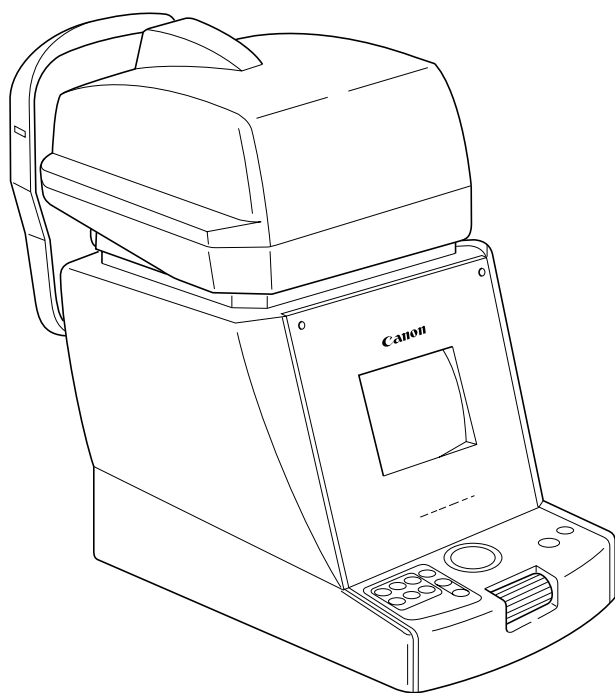


Canon

TX-F

Full Auto Tonometer

Operation Manual



Before using the instrument, be sure to read this manual thoroughly.
Keep the manual where it is easily accessible.

PLEASE NOTE

1. The user is responsible for the use and maintenance of the product. We suggest that a member of the user's staff be designated as being in charge of maintenance so as to ensure that the product is kept in a safe and good condition.
Also, medical products must be used only by a qualified person.
2. In no event will Canon be liable for direct or indirect consequential damage arising out of the use of this product.
3. This product may malfunction due to electromagnetic waves caused by portable personal telephones, transceivers, radio-controlled toys, etc. Be sure to avoid having objects such as these, which affect this product, brought near the product.
4. Canon reserves the right to change the specifications, configuration and appearance of the product without prior notice.

Safety Information

Regulations

For U.S.A.

Federal law restricts this device to sale by or on the order of an ophthalmologist or optometrist.

This instrument is a CLASS I EQUIPMENT and TYPE B APPLIED PARTS according to UL2601-1.

MEDICAL ELECTRICAL EQUIPMENT
WITH RESPECT TO ELECTRIC SHOCK,
FIRE AND MECHANICAL HAZARDS
ONLY IN ACCORDANCE WITH UL2601-1
AND CAN/CSA C22.2 NO. 601.1
41C4

Do not make any changes or modifications to the equipment unless otherwise specified in the manual.

If such changes or modifications should be made, you could be required to stop operation of the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules.

These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.

This equipment generates, uses, and can radiate frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.

Operation of this equipment in a residential area is likely to cause harmful interference in with case the user will be required to correct the interference at his own expense.

Use of shielded cable is required to comply with class A limits in Subpart B of part 15 of FCC rules. The following mark shows compliance of the instrument with Directive 93/42/EEC.



For Canada

This equipment complies with the Canadian ICES-003 class A specifications.





General Safety Information

Follow the safety instructions in this manual and all warnings and cautions printed on the warning labels. Ignoring such cautions or warnings while handling the product may result in injury or accident. Be sure to read and fully understand the manual before this product. Keep this manual for future reference.


Meaning of Caution Signs

 WARNING	This indicates a potentially hazardous situation which, if not heeded, could result in death or serious injury to you or others.
 CAUTION	This indicates hazardous situation which, if not heeded, may result in minor or moderate injury to you or others, or may result in machine damage.
NOTE	This is used to emphasize essential information. Be sure to read this information to avoid incorrect operation.









Environment of Use and Storage

 WARNING	Do not use or store the instrument near any flammable chemicals such as alcohol, thinner, benzene, etc. If chemicals are spilled or evaporate, it may result in fire or electric shock through contact with electric parts inside the instruments. Also, some disinfectants are flammable. Be sure to take care when using them.
 WARNING	Do not use or store the instrument in a location with the conditions listed below. Otherwise, it may result in failure or malfunction, fall or cause fire or injury. <ul style="list-style-type: none"> - Close to facilities where water is used. - Where it will be exposed to direct sunlight. - Close to air- conditioner or ventilation equipment. - Close to heat source such as a heater. - Prone to vibration. - Insecure place. - Dusty environment. - Saline or sulfurous environment. - High temperature or humidity. - Freezing or condensation.
 CAUTION	Place the instrument on a firm table Do not place it extremely near the edge of the table in order to avoid damage or injury due to falling.
 CAUTION	Do not cover the vent holes on the cover. Otherwise, the temperature in the instrument may rise and cause fire.













Installation Operation

 WARNING	<p>Do not connect the instrument with anything other than specified. Otherwise, it may result in fire or electric shock.</p> <p>Also, when other equipment is going to be connected to the instrument using the connector for interface, be sure to check after connection that leakage current is within the tolerable value.</p> <p>For details, please contact Canon representative or distributor.</p>
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Power Supply

 WARNING	<p>Only operate the instrument with the type of power supply indicated on the rating label. Otherwise, it may result in fire or electric shock.</p>
 WARNING	<p>Be sure to disconnect/connect the cables as indicated in this manual. The unit weighs 21 kg, so bear in mind that it may tip over if proper care is not taken.</p> <p>Also, do not handle them with wet hands. Otherwise, you may get an electric shock that may result in death or serious injury.</p>
 WARNING	<p>Securely plug in the power cable into the AC outlet.</p> <p>If contact failure occurs, or if dust or metal object comes in contact with the exposed metal prong of the plug, fire or electric shock may result.</p>
 WARNING	<p>Be sure to hold the plug or connector to disconnect the cable.</p> <p>If you pull the cable, the core wire may be damaged, resulting in fire or electric shock.</p>
 WARNING	<p>Do not cut or process the cables. Also, do not place anything heavy, including the instrument on it, step on it, pull it, bend it, or bundle it.</p> <p>Otherwise, the cable may be damaged, which may result in fire or electric shock.</p>
 WARNING	<p>Do not get the power for more than one instrument from the same AC outlet. Otherwise, it may result in fire or electric shock.</p>
 CAUTION	<p>The instrument is shipped with a grounding type (three-core) power cable. To reduce the risk of electric shock, always plug the cable into a grounded power outlet.</p>
 CAUTION	<p>To make it easy to disconnect the plug at any time, avoid putting any obstacles near the outlet.</p>


Handling

 WARNING	Do not measure an eye of which cornea is frail due to corneal disease or due to it having undergone an operation. Otherwise, complications may occur.
 WARNING	Never disassemble or modify the product as it may result in fire or electric shock. Also, since the instrument incorporates high-voltage parts that may cause electric shocks and other hazardous parts, touching them may cause death or serious injury.
 WARNING	Do not place anything on top of the instrument. Otherwise, the object may fall and cause injury. Also, if metal objects such as needle or clip falls into the instrument, or if liquid is spilled, it may result in fire or electric shock.
 WARNING	When the instrument is going to be moved, be sure to turn OFF the power switch, unplug the power cable from the AC outlet, and disconnect other cables. Otherwise, cable may be damaged, which may result in fire or electric shock. Also, when the instrument is going to be carried, be sure to support the bottom of the instrument and hold it horizontally. Do not hold it by the face rest poles or other parts, as they may come off and result in injury.
 WARNING	Do not hit or drop the instrument. The instrument may be damaged if it receives a strong jolt, which may result in fire or electric shock if the instrument is used without it being repaired.
 CAUTION	Wipe the forehead rest with ethanol or glutaraldehyde solution to disinfect it each time a different patient uses the instrument, in order to prevent infection. Please consult a specialist for the procedure for disinfection.
 CAUTION	Change the chin rest paper each time the examinee changes in order to keep the chin rest clean.
 CAUTION	Measurement head moves when the instrument is initializing or after printing the result. Do not have the examinee place his/her face on the chin rest until movement is completed. Otherwise, the examinee may be hurt.
 CAUTION	Set the position where to stop the measurement head with the LIMITER switch each time the examinee changes in order to prevent accidental contact of nozzle with examinee. Be sure to look from side of the examinee when deciding the stop position. If the stop position is not set correctly, the examinee may be injured. Also, if the message "LIMITER OFF" does not disappear even after LIMITER switch pressed several times, stop the measurement and contact Canon representative or distributor.
 CAUTION	Do not have the examinee place his/her hand or fingers under the chin rest or near the measurement head. Otherwise, injury may result.
 CAUTION	Do not touch the cutter of the printer. Otherwise, fingers may be cut.
 CAUTION	When the instrument is not going to be used, turn OFF the power switch. Also, unplug the power cable from the AC outlet when it is not going to be used for a long time.






Handling

 CAUTION	<p>This instrument uses a lithium battery, which may pollute the environment if the instrument is abandoned. Please contact Canon representative or distributor before disposing of the instrument.</p>
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When Problem Occurs

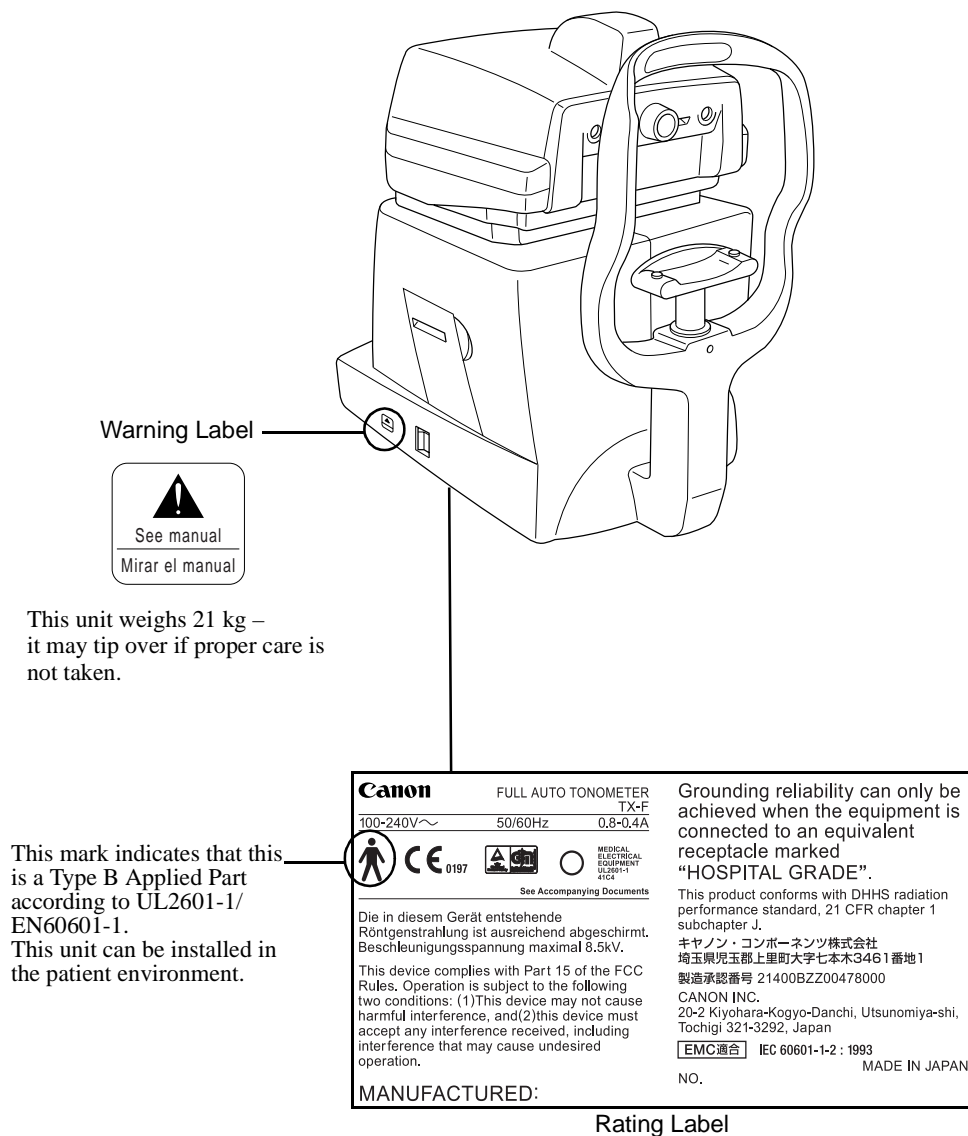
 WARNING	<p>Should any of the following occur, immediately turn OFF the power of each instrument, unplug the power cable from the AC outlet, and contact Canon representative or distributor.</p> <ul style="list-style-type: none"> - When there is smoke, odd smell or abnormal sound. - When liquid has been spilled into the instrument or a metal object has entered through an opening. - When the instrument has been dropped and it is damaged.
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Maintenance and Inspection

 WARNING	<p>For safety reasons, be sure to turn OFF the power of each instrument when the inspections indicated in this manual are going to be performed. Otherwise, it may result in electric shock.</p>
 WARNING	<p>When the instrument is going to be cleaned, be sure to turn OFF the power of each instrument, and unplug the power cable from the AC outlet. Never use benzine, thinner or any other flammable cleaning agents. Otherwise, fire or electric shock may result.</p>
 WARNING	<p>Clean the plug of the power cable periodically by unplugging it from the AC outlet and removing dust or dirt from the plug, its periphery and AC outlet with a dry cloth. If the cable is kept plugged in for a long time in a dusty, humid or sooty place, dust around the plug will attract moisture, and this could cause insulation failure which could result in a fire.</p>
 WARNING	<p>The instrument must be repaired by a qualified engineer only. If it is not repaired properly, it may cause fire, electric shock, or accident.</p>
 CAUTION	<p>For safety reasons, be sure to inspect the instrument before using it.</p>

Rating Label and Warning Label

The TX-F has a rating label and a warning label on it.
Contents of those and positions where they are attached are indicated below.



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1. Overview

The Canon Full Auto Tonometer *TX-F* is an instrument for measuring intraocular pressure without making contact with examinee's eye.

Just by displaying the examinee's eye somewhere on the monitor and pressing the **START** switch, the *TX-F* then automatically performs alignment and measurement by a three dimensional tracking system.

Measurement mode can be selected

The examiner can select a measurement mode from three modes: *FULL AUTO*, *AUTO* and *MANUAL*.

In *FULL AUTO* mode, measurement of both eyes will be performed automatically. Also, the result can be selected to be printed automatically after measuring both eyes. Thus, full measurement can be done very easily in a short time.

In *AUTO* mode, alignment and measurement will automatically be performed once each time the **START** switch is pressed. Thus, you can perform measurement after checking the condition of examinee's eye each time. Also, you can measure the eye as many times as required.

In *MANUAL* mode, measurement can be performed manually when examinee's pupil is eccentric, or when measurement is apt to result in error.

Observation range of examinee's eye on the monitor has been widened and the depth of focus is deep

It is easier to check the position of the eye or whether eyelashes are covering the pupil.

Level meter will be displayed

The *TX-F* obtains intraocular pressure from the waveform of the signal obtained by detecting light reflected from the cornea when air is blown onto the eye.

However, when the reflected light is obscured by the eyelid or eyelashes, the waveform of the signal becomes low, reducing the reliability of the measurement value.

The level of the waveform can be displayed in four steps as a mark ("level meter") on the measurement mode screen, display mode screen and the printout by the setting in **SET** mode. Thus, the level meter can be used to check the reliability of the measured values.

When error has occurred, image will be displayed immediately on the monitor

This makes it easier to determine the cause of the measurement error.

Also, the eyelid warning line on the warning image will enable you to see if the eyelid or eyelashes were too low during measurement. If the eyelid or eyelashes are below the line, help the examinee open the eye wide by gently holding up the upper eyelid with your fingers.

2. Notes for Using the Instrument

Before Use

- (1) Sudden heating of the room in cold areas will cause condensation to form on the protective glass in the measurement window and on optical parts inside the instrument. In this case, wait until condensation disappears before performing measurement.

During Measurement

- (1) Before measurement, explain about the measurement that is going to be performed to the examinee so he/she will not be surprised by a sudden air puff. Demonstrate the intensity of the air puff by having the examinee place a finger in front of the nozzle and pressing the CLEAR (DEMO) switch for more than 2 seconds.
- (2) Measurement head automatically moves after the power is turned ON. Do not prevent movement of measurement head by holding it or placing something near it.
- (3) It is recommended that a hard copy of the printout be made if you wish to store it for a long time, because printouts on thermal paper are apt to deteriorate.

After Use

- (1) Turn OFF the power, put the cap over the nozzle in order to prevent dust from attaching to it, and place the dust cover over the instrument.

During Cleaning and Disinfection

- (1) If the surface of the objective lens on the nozzle is wiped when dust or dirt is on it, it will be scratched. Also, do not wipe the objective lens with ethyl alcohol or with cleaning paper containing silicone. Otherwise, the surface will be corroded, or will be stained. See section 8.3.2.
- (2) Do not use alcohol, benzine or thinner for cleaning the cover of the instrument. Also, never wipe the cover with ethanol or glutaraldehyde solution. Otherwise, coating will be corroded. See section 8.3.4.

Environment of Use

- (1) After a long time of use, dust in the air will attach not only on the nozzle, but also on optical parts inside the instrument, which may cause incorrect measurement. Always keep the room clean.

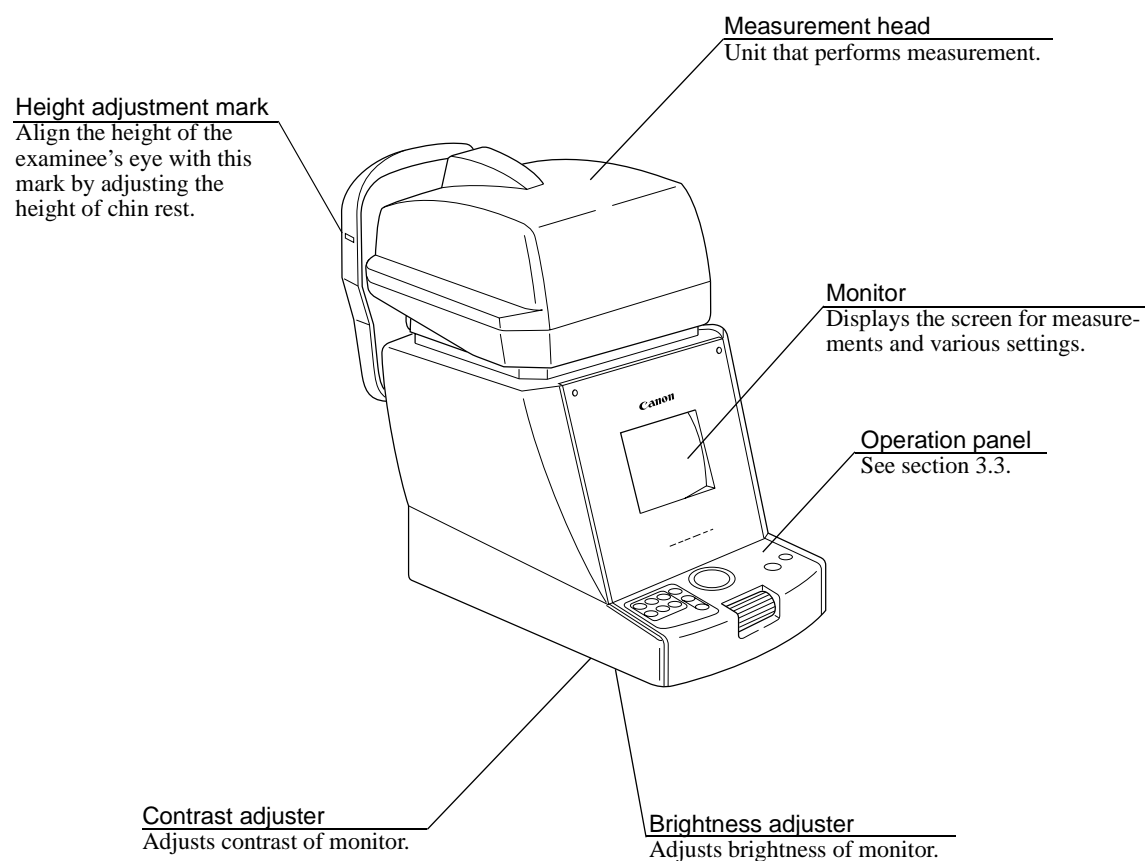
During Installation

- (1) Handle the instrument carefully, as preadjustment may be altered if the instrument receives a strong jolt.
- (2) Do not install the instrument where it will be exposed to direct sunlight. Otherwise, it will be hard to see the monitor properly, or you may not be able to obtain a correct measurement.
- (3) Blow off the dust in the connectors of the cables with a blower before connecting them. Otherwise, connection failure may occur.
- (4) Do not lay the instrument on its side when the power is turned ON. Otherwise, the instrument will malfunction.
- (5) When the instrument is going to be transported, it must be protected against vibration and shocks. Contact Canon representative or distributor for advice on the procedure for packing it.

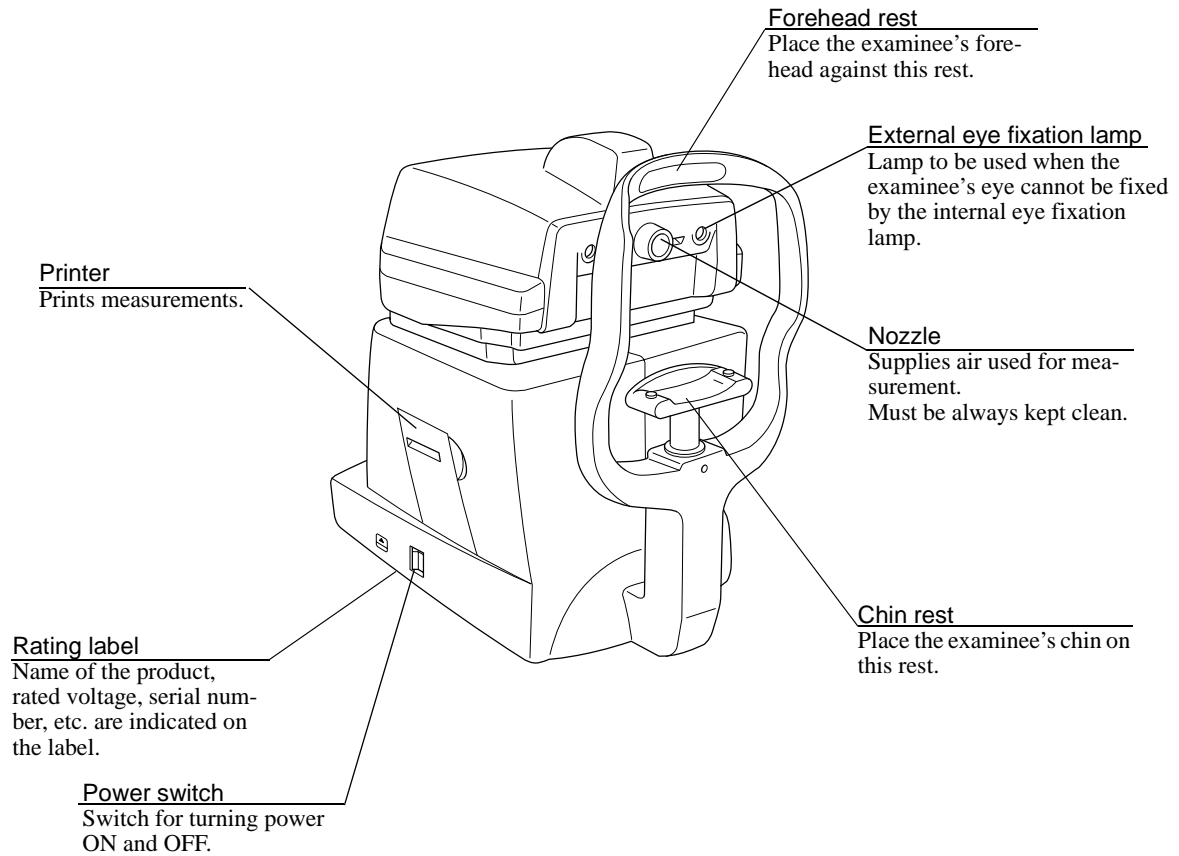
3. Description

3.1 Main Unit

3.1.1 Examiner's Side



3.1.2 Examinee's Side



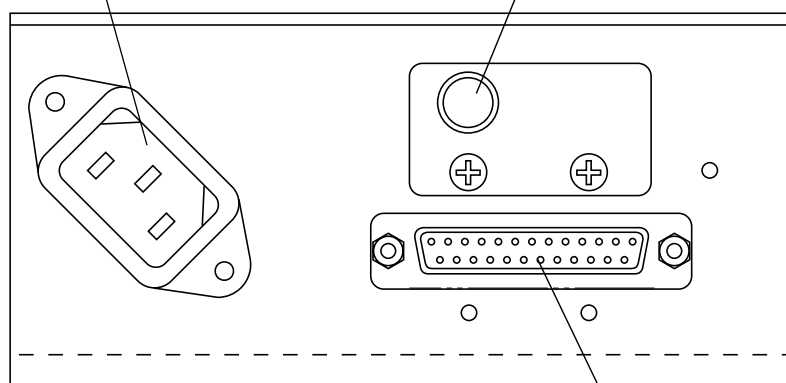
3.2 Connectors under the Main Unit

Power supply connector

Connector for the power supply cable.

Grounding terminal

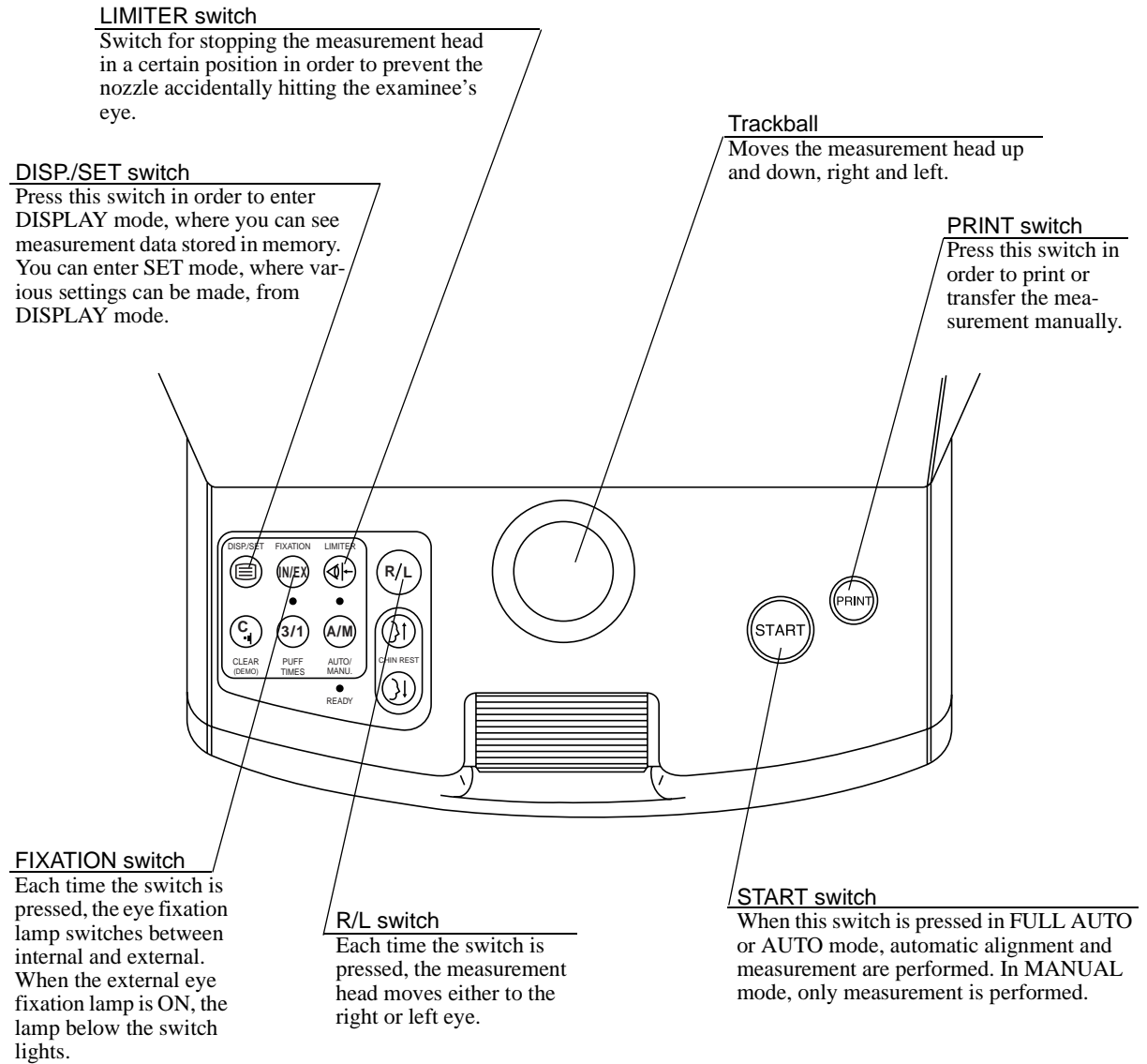
Terminal for grounding the instrument.



RS232C Connector

RS232C connector for connecting external instrument. External instrument must be connected in compliance with the IEC601-1-1 standard.

3.3 Operation Panel



CLEAR (DEMO) switch

This switch has two functions.
If printing is not necessary after the measurement, press this switch for an instant. Displayed measurement will be deleted, clearing the display for the next examinee. Or, if the switch is pressed for more than two seconds, air will be emitted from the nozzle for demonstrations of air puff.

AUTO/MANU. switch

Press this switch to select measurement mode (FULL AUTO/AUTO/MANUAL). The selected mode will be displayed on the upper left side of the monitor. Lamp above the switch lights when FULL AUTO or AUTO mode is selected.

CHIN REST switches

Switches for raising/lowering the chin rest.

PUFF TIMES switch

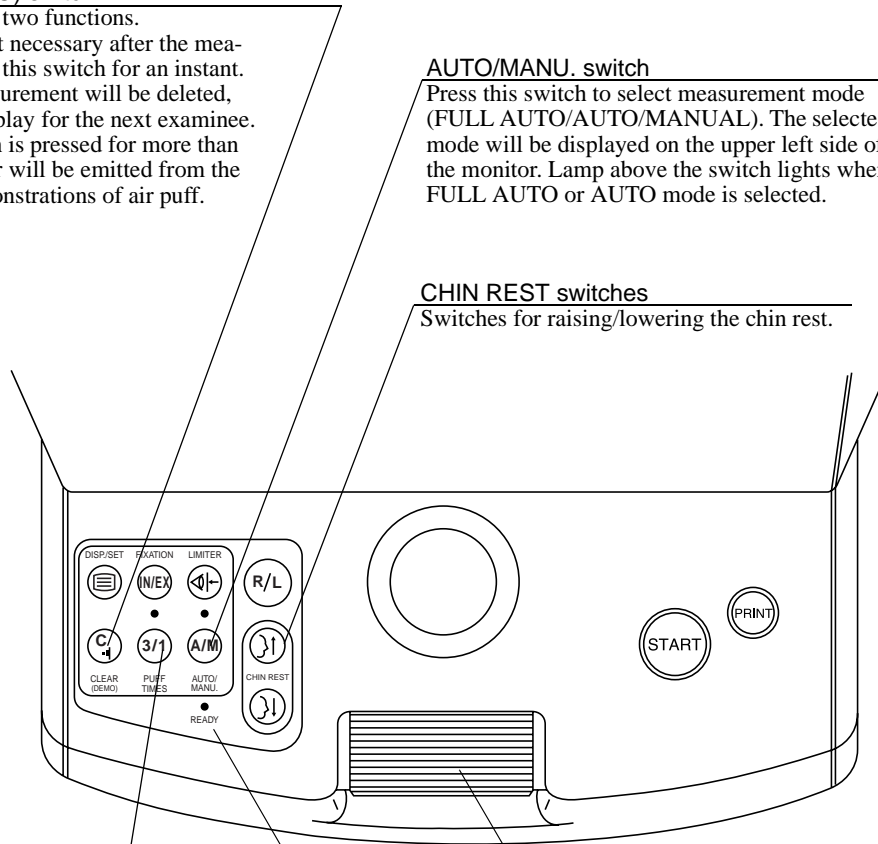
Each time the switch is pressed, the number of times of measurement (1 or 3) in FULL AUTO mode can be selected. The number of times will be displayed within the brackets next to "FULL AUTO".

Roller

Moves the measurement head back and forth.

READY lamp

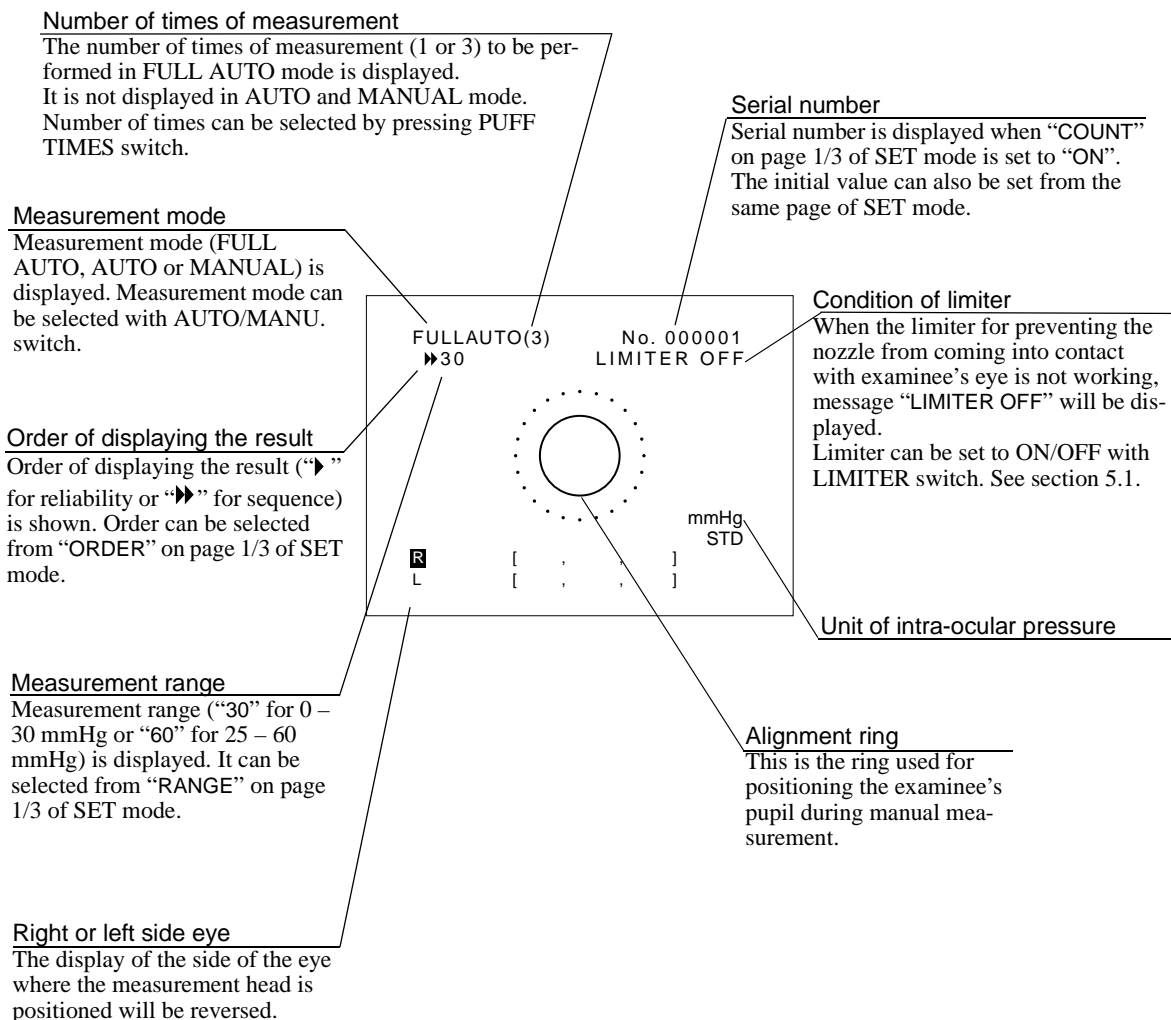
It is ON when the instrument is ready for measurement, and blinks during initialization or when power-saving system is operating.



3.4 Display on Measurement Screen

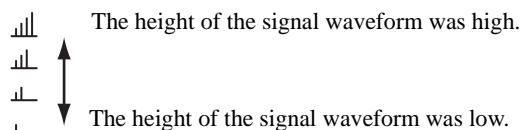
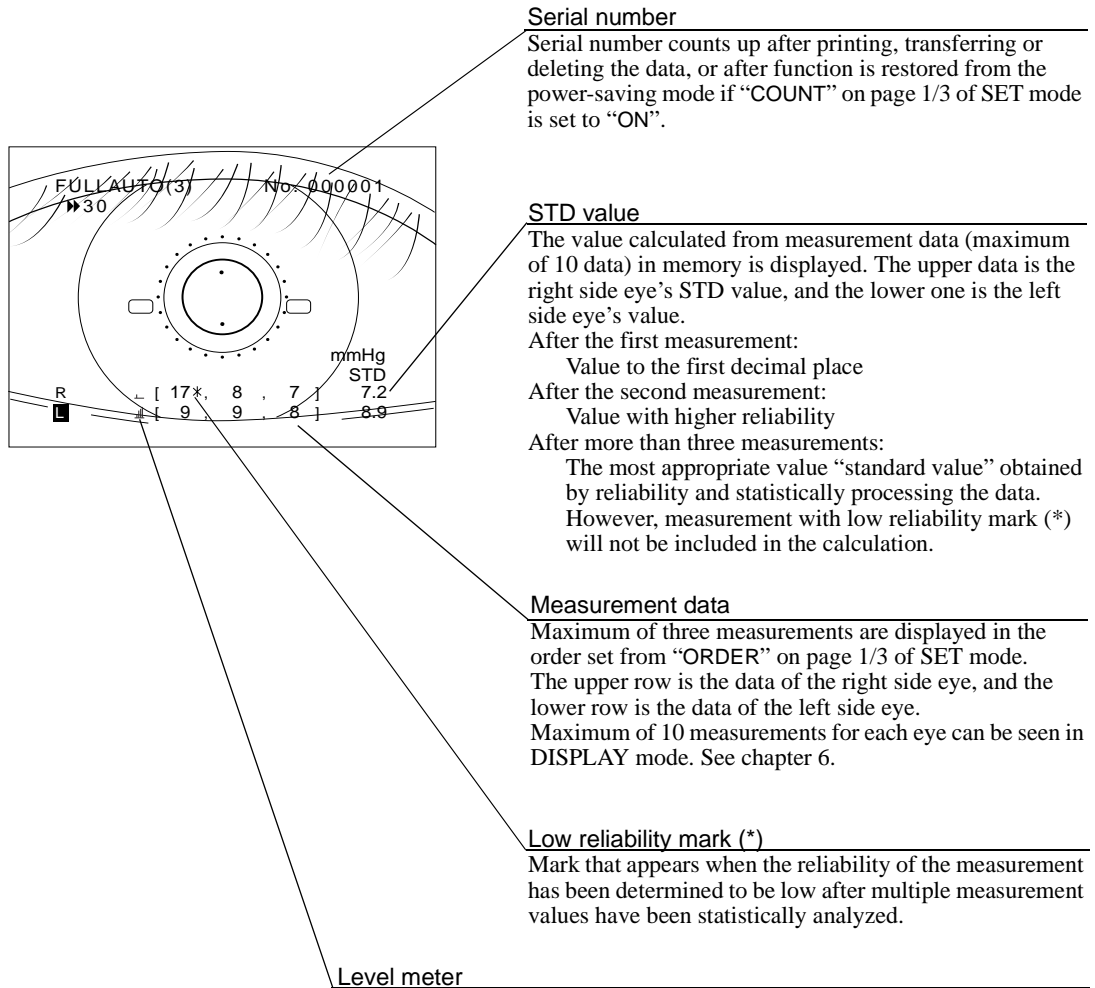
The screen below is an example when FULL AUTO mode is selected.

3.4.1 Before Measurement



3.4.2 After Measurement

When measurement has been done normally

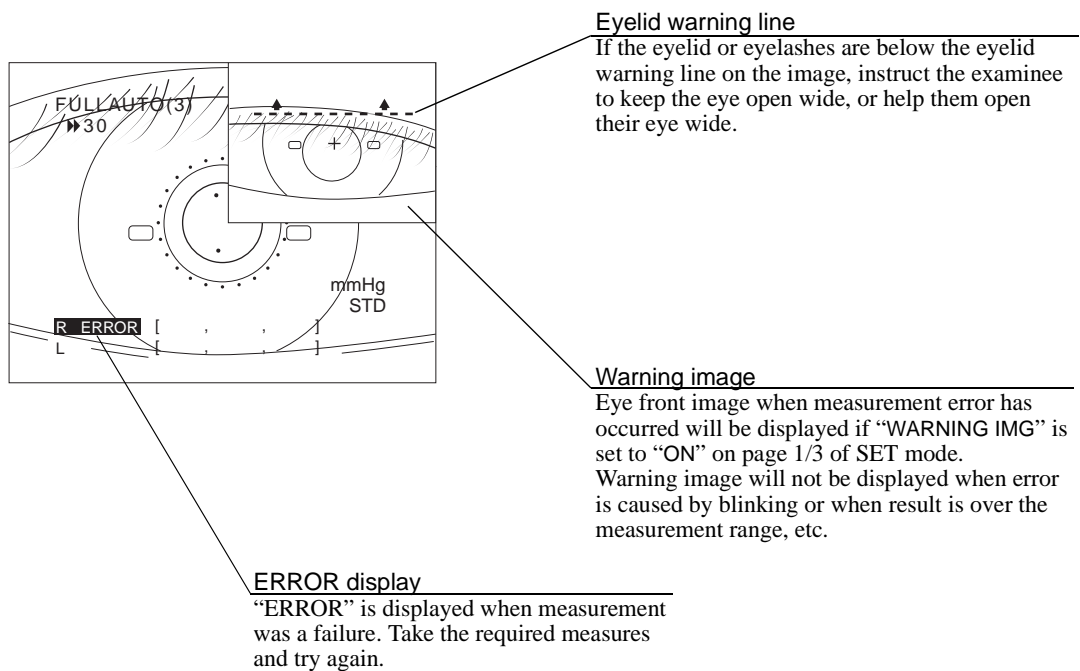


When reflected light is obscured by the eyelid or eyelashes, the waveform of the signal becomes low, reducing the reliability of the measurement value. Therefore, the level meter can be used to check the reliability of the measured values.

To display the level meter, set "LEVEL" to ON as described on page 2/3 of SET mode. Level meter of the newest measurement will be displayed on the measurement mode screen. Level meter of all the measured values can be seen in the display mode screen.

NOTE: Maximum level of the level meter differs for each eye, due to differences in corneal reflection rates.

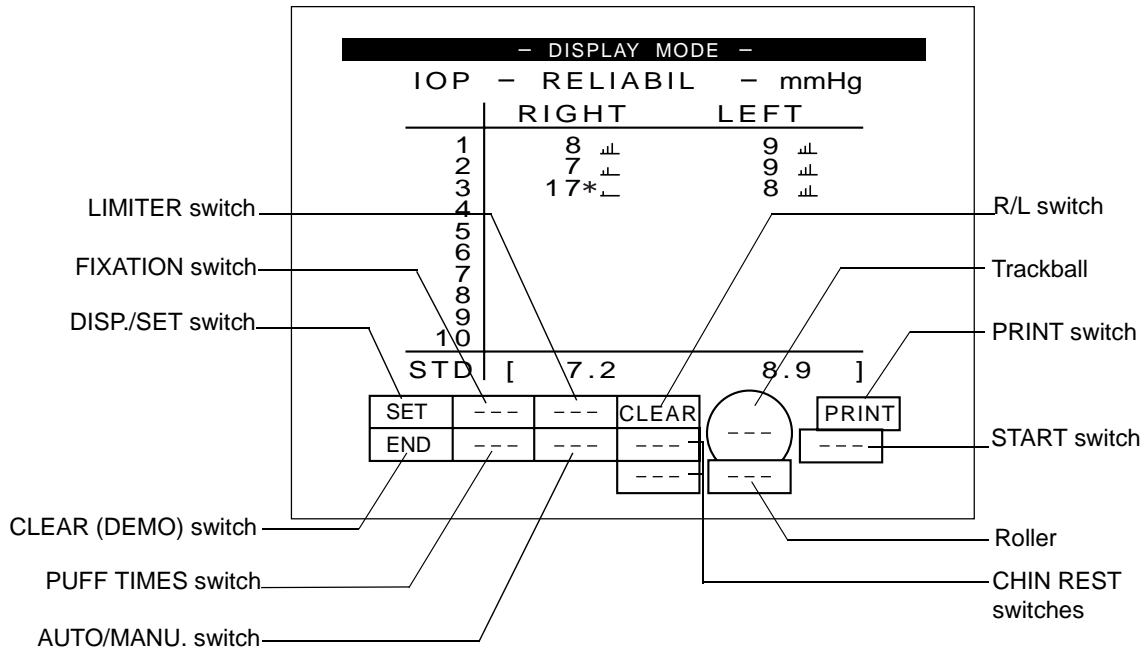
When measurement error has occurred



3.5 Display on DISPLAY and SET Modes Screens

In DISPLAY and SET modes, a diagram showing the switches and their functions for the operation will be displayed on the lower part of the monitor, because the functions differ from that screen in the display of the switches.

The diagram corresponds to the switches on the operation panel as follows:



4. Measurement Modes

4.1 Measurement Modes

There are three modes for performing measurement: *FULL AUTO*, *AUTO* and *MANUAL*. Measurement mode can be selected with the AUTO/MANU. switch.

However, in the following cases, FULL AUTO or AUTO mode will automatically be selected according to the “DEFAULT” setting in SET mode no matter what modes has been selected:

- After power is turned ON
- After PRINT switch is pressed
- After CLEAR (DEMO) switch is pressed to delete measurement data
- After returning to measurement mode from power-saving mode

FULL AUTO Mode

After displaying the examinee’s eye on the monitor, the examiner presses the start switch. The instrument will then automatically perform alignment, focusing and measurement. After measuring one eye, the instrument automatically measured the other eye in turn. By setting the options in SET mode as follows, the result will automatically be printed after both eyes have been measured, and the measurement head will return to the initial position:

“PRINT: ON” (See section 7.2)

“AUTO PRINT: ON” (See section 7.2)

AUTO Mode

In the same way as in FULL AUTO mode, the examiner presses the START switch after displaying the examinee’s eye on the monitor. However, the instrument will automatically perform alignment, focusing and measurement only once. Press the START switch if you wish to repeat measurement.

It is recommended that AUTO mode be selected where the examiner wishes to check the condition of the examinee’s eye each time before starting the measurement in cases such as when the examinee cannot keep his/her eye open.

Press the R/L switch to move the measurement head to the opposite side if you wish to measure the other eye.

Press the PRINT switch to print out the result.

MANUAL Mode

Select MANUAL mode when the pupil is eccentrics, or when measuring a certain examinee is apt to result in error in FULL AUTO or AUTO mode.

In MANUAL mode, the examiner must perform precise alignment and focus manually, and then press the START switch to measure. Result will be printed by pressing the PRINT switch. However, after printing the result or deleting the data, the instrument will return to FULL AUTO or AUTO mode.

4.2 Relation between Settings and Measurement Operation

The measurement operation differs according to the combination of measurement mode and settings selected in SET mode.




The following table shows typical examples of combinations.

Settings					Measurement Operation	Use
Measur ement Mode (AUTO/ MANU. switch	SET Mode					
	DE- FAULT	PRINT	AUTO PRINT	TRANS		
FULL AUTO	FULL AUTO / AUTO	ON	ON	ON	After measuring both eyes automati- cally as many times as set, result will automatically be printed and trans- ferred. Then, measurement head returns to the initial position.	To have the result printed and transferred automati- cally after full automatic measurement.
	FULL AUTO / AUTO	OFF	OFF	ON	Both eyes will automatically be mea- sured as many times as set. Result will be transferred by pressing PRINT switch. Then, measurement head returns to the initial position.	To transfer but not print the result after full auto- matic measurement.
AUTO	FULL AUTO / AUTO	ON	ON/ OFF	ON	One eye will automatically be measured once. If you wish to measure the other eye, press R/L switch and then START switch. Result will be printed and transferred by pressing PRINT switch.	To print and transfer the result after automatic measurement.
	FULL AUTO / AUTO	OFF	ON/ OFF	ON	One eye will automatically be measured once. If you wish to measure the other eye, press R/L switch and then START switch. Result will be transferred by pressing PRINT switch.	To transfer but not print the result after automatic measurement.

4.2 Relation between Settings and Measurement Operation

Settings					Measurement Operation	Use
Measur ement Mode (AUTO/ MANU. switch	SET Mode					
	DE- FAULT	PRINT	AUTO PRINT	TRANS		
MAN- UAL	FULL AUTO	ON	ON/ OFF	ON	Alignment and measurement are per- formed manually. Result is printed and transferred by pressing PRINT switch. Then, the measurement head returns to initial position. After printing/transferring/deleting the result, instrument returns to FULL AUTO mode.	To print and transfer the result after manual mea- surement from FULL AUTO mode.
	AUTO	ON	ON/ OFF	ON	Alignment and measurement are per- formed manually. Result is printed and transferred by pressing PRINT switch. Then, the measurement head returns to initial position. After printing/transferring/deleting the result, instrument returns to AUTO mode.	To print and transfer the result after manual mea- surement from AUTO mode.

5. Measurement

 WARNING	Do not measure an eye of which cornea is frail due to corneal disease or due to it having undergone an operation. Otherwise, complications may occur.
 WARNING	Should any of the following occur, immediately turn OFF the power switch, unplug the power cable from the AC outlet, and contact Canon representative or distributor. <ul style="list-style-type: none">– When there is smoke, odd odor or abnormal sound.– When liquid has been spilled into the instrument or a metal objects has entered through an opening.– When the product has been dropped or its housing damaged.
 CAUTION	Measurement head moves when the instrument is initializing or after printing the result. Do not have the examinee place his/her chin on the chin rest until movement is completed. Otherwise, the examinee may be hurt.

When any operation has been interrupted for more than 3 minutes with the power turned ON, power-saving system of the TX-F operates.

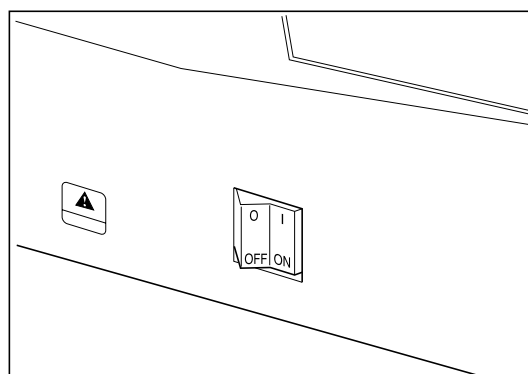
Buzzer sounds when the instrument is entering or going out of this mode, and READY lamp blinks while this system is operating. Press any one of the switches in order to restore the function.

5.1 Preparation

Preparation is the same for any measurement mode and for both automatic and manual measurements.

1 Turn ON The power

Remove the cap from the nozzle and turn ON the power switch.



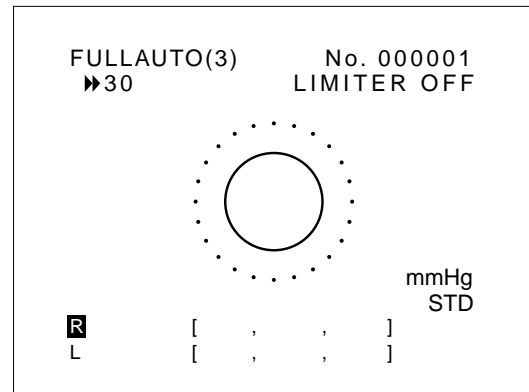
NOTE: Make sure that dust does not attach on the cap while measurement is being performed.

Initial checks inside the instrument start automatically. When the checks are completed, the measurement head will move and stop at the right eye side (initial position).

2 Measurement screen will appear

Display as shown on the right will appear when initialization ends.

See section 3.4 for details on the display.



3 Check the settings

Check and change the settings concerning measurement and printing as required (see sections 4.2, 7.1 and 7.2).

If you want to print a message with the result, enter it (see section 7.3).

4 Explain about the measurement to the examinee

Explain about the measurement to the examinee so he/she will not be surprised by a sudden air puff.




By pressing CLEAR (DEMO) switch for more than two seconds, you can demonstrate the strength of air puff to the examinee, even without examinee's eye displayed.

5 Select the eye to be measured

Press R/L switch as required in order to move the measurement head to the side of the eye to be measured.

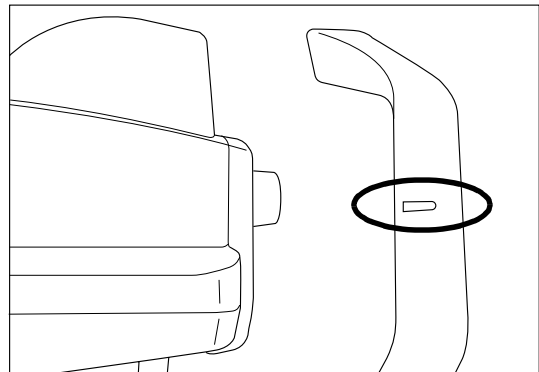
The display of the side of the eye will be displayed in reversed image.

6 Adjust the height of the examinee's eye


 CAUTION	Ensure that the examinee has not placed his/her hand or fingers under the chin rest. Otherwise, fingers may be hurt.
 CAUTION	Wipe the forehead rest with ethanol or glutaraldehyde solution to disinfect it each time a different examinee uses it, in order to prevent infection. Please consult a specialist for the procedure of disinfection. If you are using disinfectant other than those specified above, or if you are mixing another disinfectant with ethanol, please also consult a specialist, because they may harm the forehead rest.
 CAUTION	Change the chin rest paper each time the examinee changes in order to keep the chin rest clean.

NOTE: Have the examinee remove contact lenses or spectacles, if he/she is wearing any.

- (1) Turn the roller toward you in order to move the measurement head away from the examinee.
- (2) Have the examinee sit and place his/her chin and forehead rest and forehead rest.
- (3) Adjust the height of the chin rest by pressing CHIN REST switches so that the eye of the examinee is aligned with the height adjustment mark on the face rest.

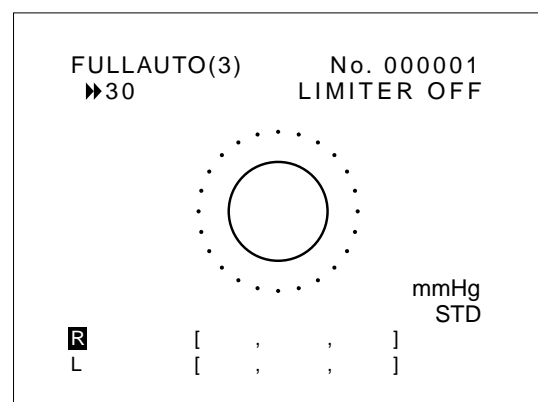


IMPORTANT 7**Set the measurement head stop position**

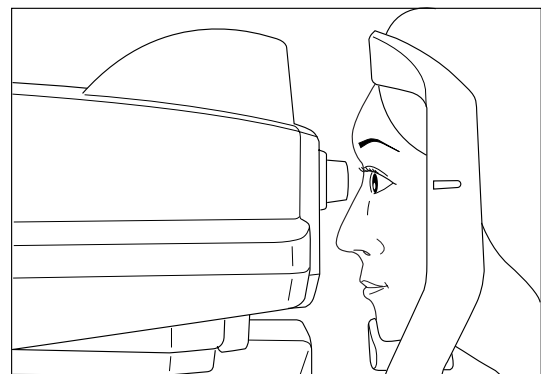
 CAUTION	<p>Set the position where to stop the measurement head with LIMITER switch before measurement in order to prevent accidental contact of nozzle with examinee.</p> <p>Be sure to have the examinee firmly press his/her forehead against the forehead rest, and look from the side of the examinee when deciding the stop position.</p> <p>If the stop position is not set, the examinee may be injured.</p> <p>Also, if the message "LIMITER OFF" does not disappear even after LIMITER switch is pressed several times, stop the measurement and contact Canon representative or distributor.</p>
--	--

- (1) Check that "LIMITER OFF" is displayed on the monitor.

Press the LIMITER switch if it is not displayed.

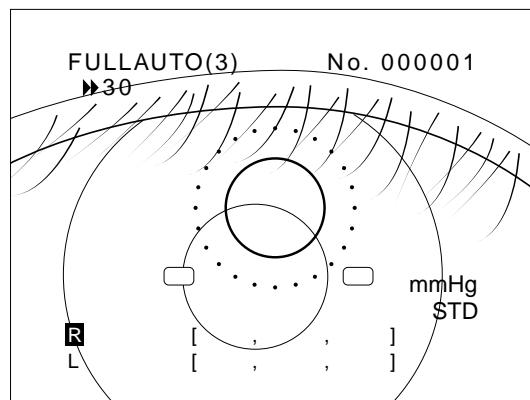


- (2) Have the examinee firmly press his/her face against the forehead and chin rests. While looking at the examinee's eye from the side, slowly turn the roller toward the monitor so the nozzle gradually moves toward the examinee's eye.



When the distance between the tip of the rubber cover on the nozzle unit and the eye becomes about 8 mm, press LIMITER switch.

Message "LIMITER OFF" will disappear from the monitor.



- (3) Slightly turn the roller back and forth in order to ensure that the nozzle does not go further the point where it has been locked.

NOTE: Limiter turns OFF when turning ON the power of the instrument, pressing PRINT switch, clearing data or when recovering from power-saving mode.

5.2 FULL AUTO/AUTO Measurement

In FULL AUTO and AUTO modes, the examiner presses the START switch after displaying the examinee's eye on the monitor.

The instrument will then automatically perform the alignment, focusing and measurement. After measuring the first eye as many times as set in FULL AUTO mode, the instrument automatically measures the other eye.

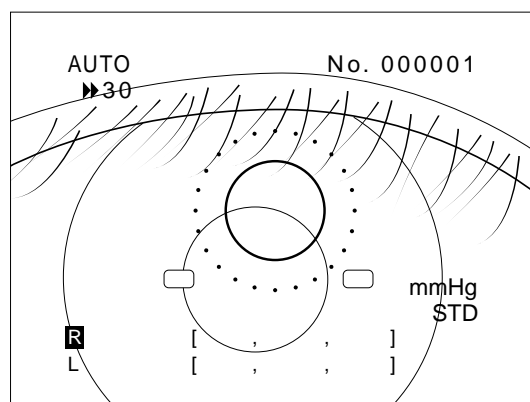
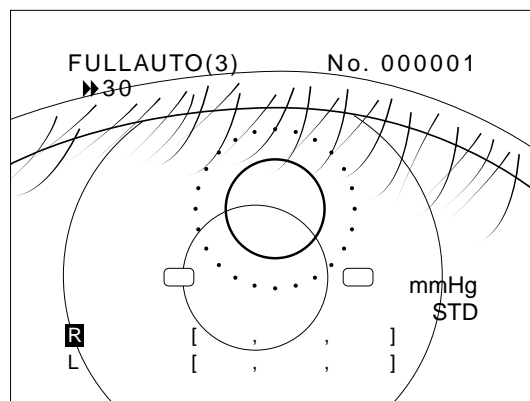
This measurement is performed only once in AUTO mode, however.

Therefore, START switch must be pressed each time you want to perform measurement in AUTO mode.

- NOTES:**
1. Be sure to do the preparation mentioned in section 5.1
 2. Measure the eye in AUTO mode if the examinee cannot keep his/her eye open and continuous measurement cannot therefore be performed in FULL AUTO mode.
 3. Measure the eye in MANUAL mode if measurement in FULL AUTO or AUTO mode results in an error due to deformation of cornea, keratitis, low reflection rate of cornea, etc. See section 5.3.

1 Select FULL AUTO or AUTO mode

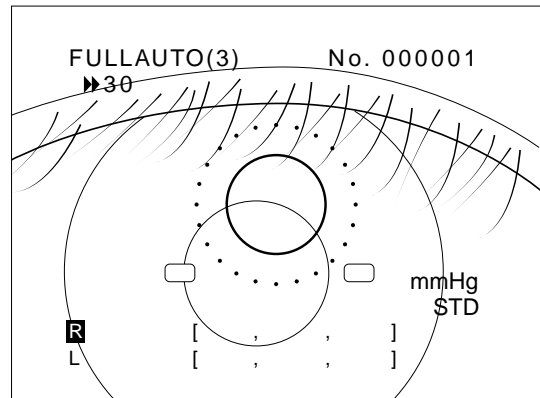
Press AUTO/MANU. switch until "FULL AUTO" or "AUTO" is displayed on the upper left side of the display.



2 Select the number of times of measurement in FULL AUTO mode

Press PUFF TIMES switch and select 1 or 3.

The number of times will be displayed within brackets () after the words "FULL AUTO".



NOTE: It is recommended that the measurement to be repeated at least three times in order to obtain more reliability.

3 Check that the examinee's eye is displayed on the monitor

If you cannot see it at all, adjust the position of the measurement head using the trackball.

◆ Adjustment of measurement head position

Measurement head moves to right and left when trackball is turned to right and left. Measurement head moves up and down when it is turned back and forth.

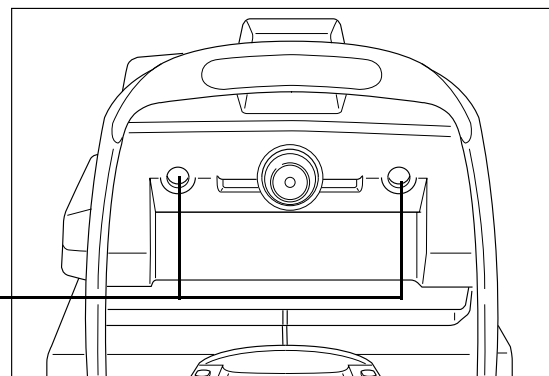
4 Have the examinee look at the eye fixation lamp

Have the examinee look at the green internal eye fixation lamp.

◆ If the examinee cannot see the lamp well and so the eye cannot be fixed

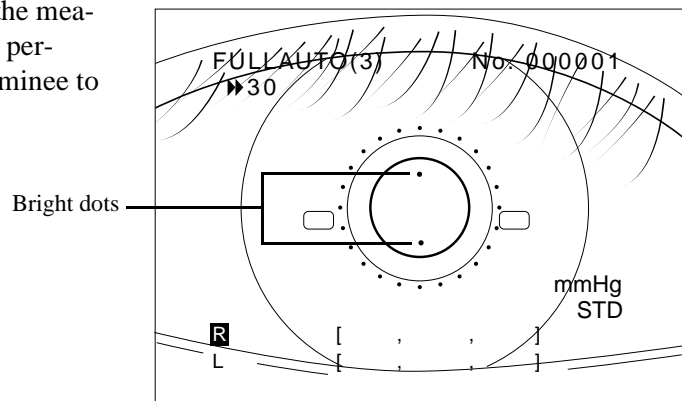
Press FIXATION switch and have the examinee look at the external eye fixation lamp on the side of the nozzle with the eye that is not going to be measured.

External eye fixation lamps



5 Start measurement

Tell the examinee that the measurement is going to be performed and ask the examinee to open his/her eye wide. Press START switch.



◆ How to stop auto alignment

Press any switch or turn the roller or trackball. The measurement head will stop. However, if the measurement head is in a position where measurement can be made, measurement will be performed if the START switch is pressed during auto-alignment (compulsory measurement). Measurement error may occur, however, if the positioning is not accurate.

◆ When a warning message “[1] EYE CANNOT BE FOUND PRESS START SW AGAIN” is displayed, or when alignment does not end

When automatic alignment cannot be performed within a specified time, the measurement head stops moving and a warning message “[1] EYE CANNOT BE FOUND PRESS START SW AGAIN” will be displayed. Also, in some cases, auto-alignment does not end, due to the condition of examinee’s eye. In this case, take the measures indicated below according to the cause.

[Cause 1] The position of examinee’s eye is off the automatic alignment range.

[Remedy 1] Move the position of examinee’s eye displayed on the monitor toward the center a little more using the roller and trackball. Then, press the START switch. Adjust the height of the examinee’s eye with the height of the chin rest as required.

[Cause 2] Examinee’s eye is moving restlessly.

[Remedy 2] Have him/her look at the eye fixation lamp. Or, if two bright dots are displayed on the monitor, measurement will be performed if the START switch is pressed timely during automatic alignment (compulsory measurement).

NOTE: Measurement error may occur if the positioning is not accurate. Perform compulsory measurement only when measurement must be done even when the examinee’s eye is not fixed.

- [Cause 3] The pupil is obscured by eyelashes or eyelid.
[Remedy 3] Instruct the examinee to keep his/her eye open wide until measurement ends, or help them open the eye widely by lifting up the upper eyelid lightly with your fingers. Then, press the START switch again.
- [Cause 4] Pupil is eccentric or deformed. Examinee has undergone an iris operation.
[Remedy 4] Display the bright dots near the center using trackball and roller. Then, press the START switch again.
- [Cause 5] There is problem in surface of examinee's cornea.
[Remedy 5] Perform measurement in MANUAL mode (see section 5.3). However, error may occur even in MANUAL mode if the disease is serious.
- [Cause 6] Effect of artificial light or sunlight reflected from the examinee's eye.
[Remedy 6] Do not expose the examinee's eye directly to bright artificial light or sunlight.

If the alignment still cannot be performed, align and measure the eye manually by referring to section 5.3.

6 After the alignment, measurement is performed automatically

When the alignment is done, air is puffed and the intraocular pressure will be measured.

FULL AUTO mode

Alignment and measurement will be performed. They will be repeated three times when number of times of measurement you have selected is "3".

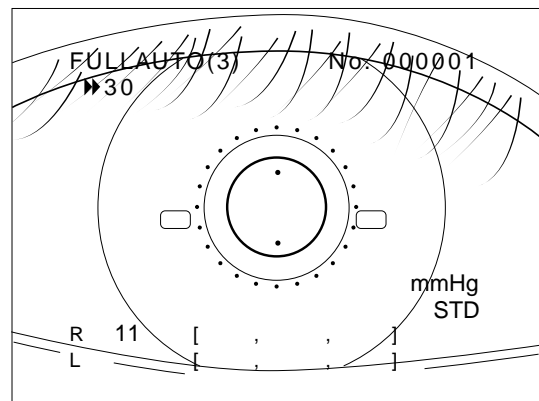
AUTO mode

Measurement will be performed once. Press START switch again to perform alignment and measurement repeatedly. Maximum of 10 data can be saved in memory.

NOTE: It is recommended that the measurements be repeated at least three times in order to obtain most reliable measurement.

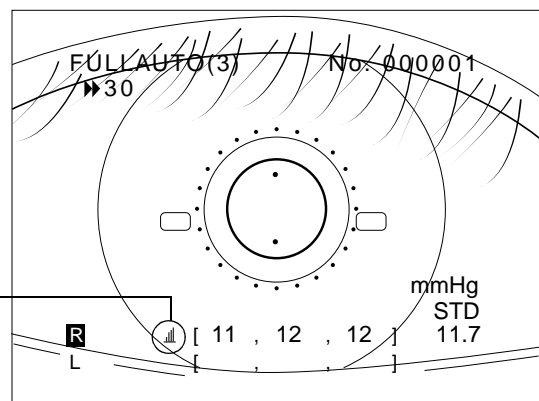
The result immediately after the measurement is displayed on the left side of the brackets [].

While the instrument is charging up, the mark indicating the eye being measured and the measurement value blinks.



After the charge up for the measurement is completed, the result will be displayed within the brackets [] and the next measurement will start. See section 3.4.2 for more information on the display.

If the setting in SET mode is ON, level meter for the newest measurement will be displayed.



◆ If level meter is low

[Cause 1] Eye was obscured by eyelid or eyelashes.

[Remedy 1] Look at the monitor. If the eyelid or eyelashes are covering the pupil, instruct the examinee to open the eye wider, or lift up the eyelid lightly with your fingers and measure again.

[Cause 2] Examinee has blinked frequently.

[Remedy 2] Tell the examinee to try not to blink for a while and measure again.

[Cause 3] Corneal reflection rate is low.

[Remedy 3] Maximum level of the level meter differs for each eye, due to differences in corneal reflection rates. Level meter will be low if corneal reflection rate is low. Continue the measurement.

◆ If any message appears and measurement is suspended

Take the measures by referring to section 8.2.2.

◆ If message "[5] IOP > (<) = xx mmHg!" appears

This message appears when values have been set for "WARNING IOP" in SET mode (see section 7.1) and the result of the measurement in FULL AUTO mode was under or above the set value.

Press START switch to measure the eye again. Measurement is performed once each time the switch is pressed.

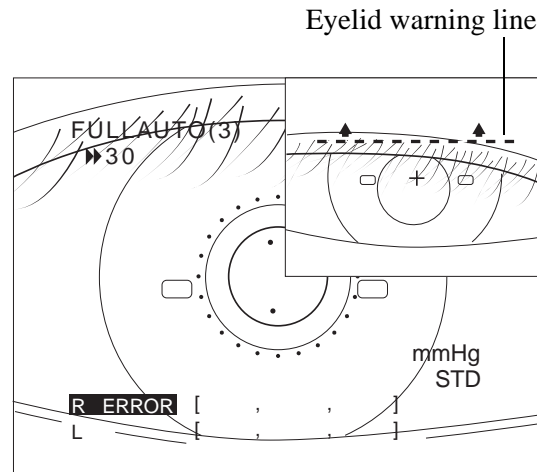
Press R/L switch to measure the other eye. Alignment will be started automatically. Or, if the other eye already has been measured, press PRINT switch to printout the result.

NOTE: Value may become high when the eye is covered by eyelashes or eyelid.

◆ **If warning image appears**

If "WARNING IMG" is set to "ON" in SET mode, eye front image taken at moment when the error occurred will be displayed on the monitor.

If the eyelid or eyelashes are below the eyelid warning line, take remedial action and then press START switch again to perform measurement.



7 Move measurement head toward the other eye

FULL AUTO mode

After the required number of data is obtained, measurement head automatically moves toward the other eye.

AUTO mode

Press R/L switch in order to move the measurement head toward the other eye.

8 Alignment and measurement of the other eye are performed

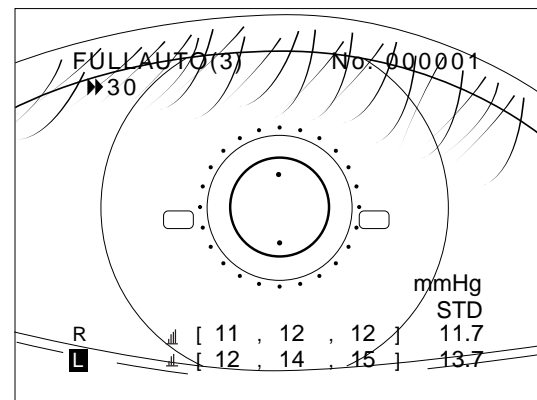
FULL AUTO mode

Alignment and measurement are performed automatically in the same ways as measuring the right eye is done when the pupil of the left eye has been detected.

AUTO mode

Display the other eye somewhere on the monitor and press START switch.

Measure as many times as required.



9 The result is printed out

FULL AUTO mode

If “PRINT” and “AUTO PRINT” are set to “ON” in SET mode, the result will be printed out automatically after both eyes are measured.

If “AUTO PRINT” is “OFF”, press PRINT switch.

AUTO mode

Press PRINT switch.

◆ If printing is unnecessary after the measurement

Press CLEAR (DEMO) switch for an instant.

(If the switch is pressed for more than two seconds, air will be emitted from the nozzle for demonstration of air puff.)

Measurement values of both eyes will be deleted from the monitor and serial number will count up if “COUNT” is set to “ON” in SET mode.

However, measurement data remains in memory until the next measurement is performed. Data in memory can be seen in DISPLAY mode (see section 6).

Also, data will be printed if PRINT switch is pressed.

- NOTES:**
1. Results will be erased from the monitor after printing/transfer is performed. Serial number will count up if “COUNT” is set to “ON” in SET mode.
 2. It is recommended that a hard copy of the printout be made if you wish to store it for a long time, because printouts on the thermal paper are apt to deteriorate.

	CANON TX-F	
Date	2004/01/20	14:25 Time
Serial number	No. : 000001	
Space for name	NAME: M/F	Sex
	IOP -SEQUENCE- mmHg	Type of result
	RIGHT LEFT	STANDARD: Only the standard value
Measurement values	11 12	RELIABIL: The three values with the highest reliability
	12 14	SEQUENCE: The three newest values
	12 15	
Standard value	[11.7 13.7]	Level meter (Printed when setting in SET mode is ON)
Optional message	CANON CLINIC	

10 Measurement head returns to initial position

When printing is completed, the measurement head returns to its initial position and waits for the next measurement.

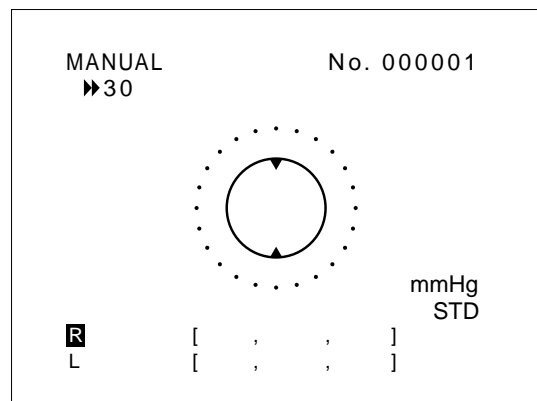
5.3 MANUAL Measurement

Select MANUAL mode when measurement cannot be performed automatically due to deformation of cornea, corneal disease such as keratitis, low reflection rate of cornea, or when measuring a certain examinee is apt to result in error.

NOTE: Be sure to perform focusing precisely in MANUAL mode. Otherwise, measurement error may occur.

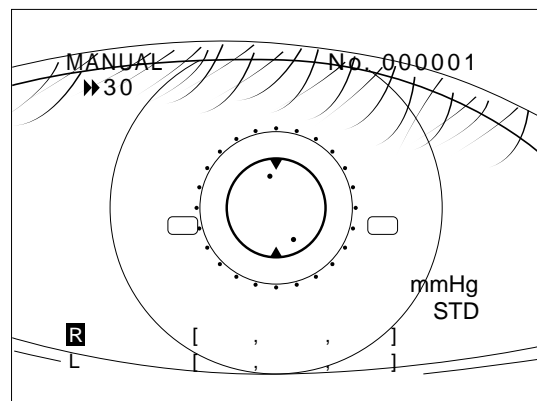
1 Choose manual measurement

Press AUTO/MANU. switch to display the word “MANUAL” on the monitor.



2 Display the examinee's eye on the monitor

Use the roller and the trackball so that the right eye of the examinee is seen approximately in the center of the monitor.



◆ Adjustment of measurement head position

Measurement head moves back and forth when the roller is turned.

It moves up and down when trackball is turned back and forth, and to right and left when trackball is turned to right and left.

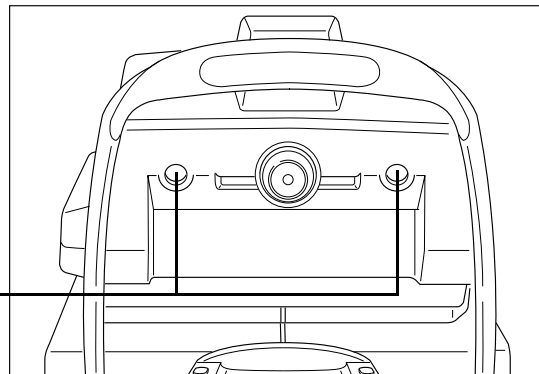
3 Have the examinee look at the eye fixation lamp

Have the examinee look at the green internal eye fixation lamp.

♦ **If the examinee cannot see the lamp well and so the eye cannot be fixed**

Press FIXATION switch and have the examinee look at the external eye fixation lamp on the side of the nozzle with the eye that is not going to be measured.

External eye fixation lamps



4 Check that the alignment ring is not covered by eyelashes

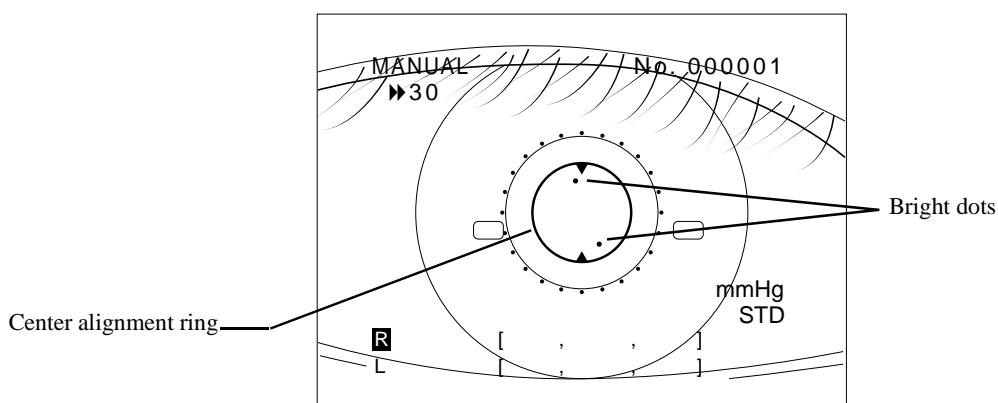
Looking at the monitor, check that the inner alignment ring (see the illustration in step 5 below) is not covered by eyelashes. If they are covering the ring, instruct the examinee to keep his/her eye opened wide until measurement ends, or help them open the eye wider by lifting up his/her upper eyelid lightly with your fingers.

NOTE: Value may become high when eye is covered by eyelid or eyelashes.

5 Perform alignment

Use the trackball to position the bright dots inside the center alignment ring.

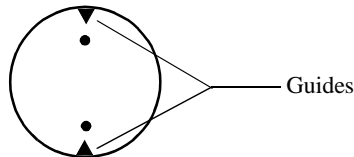
If you cannot see the dots clearly, turn the roller back and forth until you can see them.



NOTE: It may not be possible to see the bright dots clearly if the cornea is markedly deformed or when the examinee has serious keratitis. In this case, measurement may result in an error even in MANUAL mode.

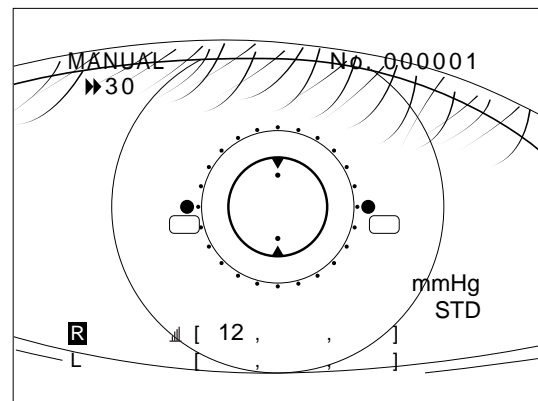
6 Perform focusing

Turn the roller back and forth to position the bright dots vertically between the alignment guides.



7 Measure the eye

Tell the examinee that measurement is going to be performed and ask the examinee to open his/her eye wide. After ensuring that the positioning and focusing are as required, press the START switch. Air is puffed and the intraocular pressure will be measured.



The result immediately after the measurement is displayed on the left side of the brackets [].

If the level meter is set to ON in SET mode, the level meter for the newest measurement will be displayed.

While the instrument is charging up, the mark indicating the eye being measured and the measurement value blinks.

After the charge up for the measurement is completed, the result will be displayed within the brackets [] and the next measurement will start.

See section 3.4.2 for more information on the display.

♦ **If any message appears and measurement is suspended**

Take the measures by referring to section 8.2.2.

♦ **If error occurs even though the positioning is correct**

Error may occur when bright dots are dim due to deformation of cornea or keratitis, even if positioning is performed properly.

8 Repeat the measurement as many times as required

NOTE: It is recommended that the measurements be repeated at least three to five times in order to obtain most reliable measurement.

Repeat alignment and measurement as many times as required. Maximum of 10 data can be saved in memory.

9 Measure the eye

Press R/L switch in order to move the measurement head toward the other eye.

10 Measure the eye

Measure the left eye in the same way as measuring the right eye.

11 Print/transfer the result

Press PRINT switch.

Instrument will return to the measurement mode (FULL AUTO or AUTO) selected for "DEFAULT" in SET mode.

♦ **If printing is unnecessary after the measurement**

Press CLEAR (DEMO) switch for an instant.

(If the switch is pressed for more than two seconds, air will be emitted from the nozzle for demonstration of air puff.)

Measurement values of both eyes will be deleted from the monitor and serial number will count up if "COUNT" is set to "ON" in SET mode.

However, measurement data remains in memory until the next measurement is performed. Data in memory can be seen in DISPLAY mode (see section 6).

Also, data will be printed if PRINT switch is pressed.

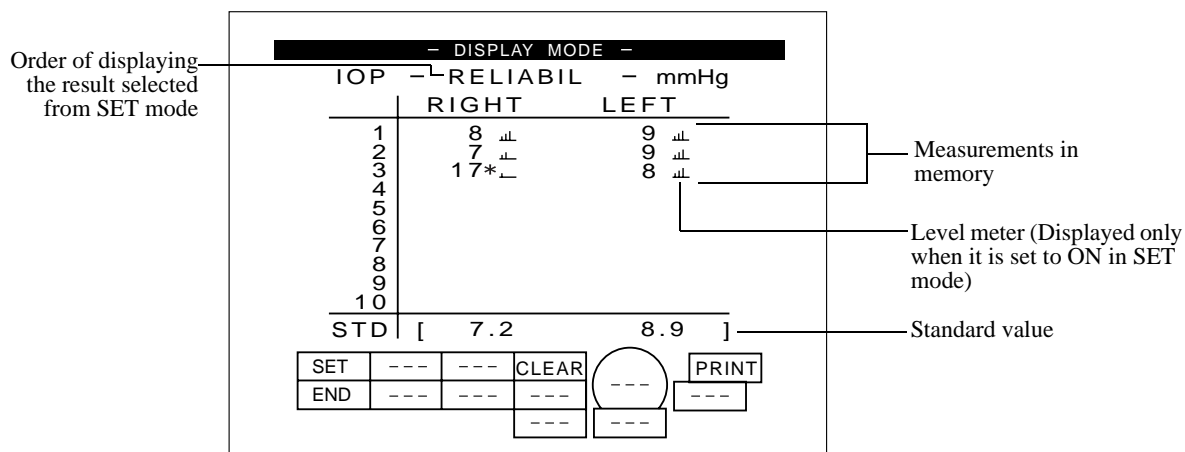
NOTES: 1. Results will be deleted from memory at the measurement after printing/transfer is performed.

2. It is recommended that a hard copy of the printout be made if you wish to store it for a long time, because printouts on thermal paper are apt to deteriorate.

6. Measurements Stored in Memory [DISPLAY Mode]

In DISPLAY mode, you can see the results (maximum of 10 data for each eye) of the measurements stored in memory.

Data will be deleted on measuring an eye after printing/transferring the result.



How to enter DISPLAY mode

Press DISP/SET switch in measurement mode.

How to print the data

Press PRINT switch.

How to return to measurement mode

Press CLEAR (DEMO) switch.

How to delete all data

Press R/L switch.

Confirmation message will appear. Press START switch to delete, or PRINT switch to cancel.

How to enter SET mode

Press DISP/SET switch in DISPLAY mode.

7. Various Settings [SET Mode]

Various settings concerning measurement, printing and data transfer can be performed in the SET mode.

There are three pages in the SET mode.

Page 1/3: Display to set items concerning measurement.

Page 2/3: Display to set items concerning printing and transfer.

Page 3/3: Display to enter message to be printed with the TX-F printer.

Settings are stored and remain even after power is turned OFF.

- SET MODE -		PAGE : 1/3	
RANGE :	30	60	
COUNT :	ON	OFF	
ERROR :	ON	OFF	
[No.] :	=012345	RESET	
ORDER :	SEQU	RELI	
DATE :	25/SEP/2002	14:50	
[ODR] :	YMD MDY	DMY	
WARNING IOP :	UNDER	ABOVE	
WARNING IMG :	OFF	25	
	ON	OFF	
---	←	→	---
END	PAGE -	PAGE +	---
	---	---	---
	▲	▼	→

How to enter SET mode

In measurement mode, press DISP./SET switch. You will enter DISPLAY mode.

Press DISP./SET switch again. The first page of the SET mode will appear.

How to change the page

To display the next page, press AUTO/MANU. switch.

To display the previous page, press PUFF TIMES switch.

How to go out of SET mode

Press CLEAR (DEMO) switch.

7.1 Settings for Measurement (Page: 1/3)

- SET MODE -				PAGE : 1/3	
RANGE :	30	60			
COUNT :	ON	OFF			
ERROR :	ON	OFF			
[No.] :	=012345	RESET			
ORDER :	SEQU	RELI			
DATE :	25/SEP/2002	14:50			
[ODR]:	YMD	MDY	DMY		
WARNING IOP :	UNDER	ABOVE			
WARNING IMG :	OFF	25			
	ON	OFF			

---	←	→	---	<div style="border: 1px solid black; border-radius: 50%; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center;"> <div style="width: 100%; height: 100%; border: 1px solid black; border-radius: 50%;"></div> </div>	---
END	PAGE -	PAGE +	---		

7.1.1 Basic Operation

How to Select the Item

Turn the roller to select the item to be changed.

The selected item will be displayed in reverse image.

How to Change the Setting

Press either FIXATION switch, LIMITER switch, START switch or PRINT switch.

The selected setting will be highlighted.

NOTE: Some settings must be changed in different ways. The procedure for changing those settings will be indicated under the explanation of each item.

7.1.2 Items

RANGE

Measurement range

- “30”: Used for measuring the range 0 - 30 mmHg.
If the result is over 30 mmHg, the range automatically changes to “60”. This is recommended to be used for group examinations and normal screening.
- “60”: Used for measuring the range of 25 - 60 mmHg. (The air puff is stronger.)
If the result is under 25 mmHg, the range automatically changes to “30”. This is recommended to be used for examination of glaucoma, etc.

COUNT	<p>Choosing whether to display the serial number on the monitor and print it out with the result</p> <p>“ON”: Serial number will be displayed on the monitor and printed/transferred with the result. It counts up after data is printed/transferred or deleted.</p> <p>“OFF”: Serial number will neither be displayed nor printed.</p>
ERROR	<p>Choosing whether to count up the serial number when all the measurements result in error. “COUNT” must be set to “ON” in order to choose “ON”.</p> <p>“ON”: Even when all the measurements result in error, header (name of the instrument, date, etc.) will be printed and serial number will count up by pressing the PRINT switch.</p> <p>“OFF”: When all the measurements result in error, “NO PRINT DATA” will be displayed on the monitor, nothing will be printed and serial number will not count up even if PRINT switch is pressed.</p>
[No.]	<p>“6-digit number”: Serial number</p> <p>[How to change the number]</p> <p>(1) Turn the roller, or press FIXATION switch or LIMITER switch to select the digit. The number of the selected digit will be displayed in reverse image.</p> <p>(2) The number increases when PRINT switch is pressed, and decreases when START switch is pressed.</p> <p>“6-digit number”: Serial number</p> <p>[How to change the number]</p> <p>(1) Turn the roller, or press FIXATION switch or LIMITER switch to select “RESET”.</p> <p>(2) Press START switch or PRINT switch.</p>
ORDER	<p>Order of displaying the result</p> <p>“SEQU”: The newest three measurements will be displayed in measurement mode, or the newest 10 measurements in DISPLAY mode. When “SEQU” is selected, it will be displayed as “▶▶” mark on the measurement mode display.</p> <p>“RELI”: The three measurements of the highest reliability will be displayed in measurement mode, or the newest 10 measurements in DISPLAY mode. When “RELI” is selected, it will be displayed as “▶” mark on the measurement mode display.</p>
DATE	<p>Date and time</p> <p>“01” - “31”: Day</p>

“JAN” - “DEC”: Month (When “YMD” is selected for “ORDER” below, month will be displayed in numbers “1” - “12”)
 “2000” - “2099”: Year
 “00” - “23”: Hour
 “00” - “59”: Minutes

[How to change the setting]

- (1) Select the item by turning roller, or by pressing FIXATION switch or LIMITER switch.
- (2) Number increases when PRINT switch is pressed.

[ODR]

Order of displaying the date
 “YMD”: Year, month, day
 “MDY”: Month, day, year
 “DMY”: Day, month, year

WARNING IOP

Choosing whether to display a warning message (“[5] IOP >(<) = xx* mmHg!”) and stop measurement when the result of measuring the eye in FULL AUTO mode is above or below the value selected here. See step 6 in section 5.2.
 * Value set here will be displayed.

[How to change the setting]


- (1) Select “UNDER” by turning roller, or by pressing FIXATION switch or LIMITER switch.
- (2) Press PRINT switch to select the required setting for “UNDER”.
 “OFF”: Warning message will not be displayed and measurement will not stop.
 “1” - “9”: Warning message will be displayed and measurement will stop when the result is below the intraocular pressure selected here.
- (3) Select “ABOVE” by turning roller, or by pressing FIXATION switch or LIMITER switch.
- (4) Press PRINT switch to select the required setting for “ABOVE”.
 “OFF”: Warning message will not be displayed and measurement will not stop.
 “15” - “25”: Warning message will be displayed and measurement will stop when the result is above the intraocular pressure selected here.

WARNING IMG

Choosing whether to display a still image immediately after measurement error has occurred in order to enable the cause of the error to be determined.
 “ON”: Error image will be displayed.
 “OFF”: Error image will not be displayed.

Press AUTO/MANU. switch to proceed to page 2/3.
 Press CLEAR (DEMO) switch to return to measurement mode.

7.2 Settings for Printing and Transfer (Page: 2/3)

- SET MODE -		PAGE ; 2/3
PRINT :	ON	OFF
[DATA]	STD	MEM
[MSG]	ON	OFF
[ECO]	ON	OFF
TRANS :	ON	OFF
[FMT]	1	
[BAU]	19200.8N1	
AUTO PRINT :	ON	OFF
DEFAULT :	AUTO	FULL AUTO
() LEVEL :	ON	OFF
CHARACTER :	JIS	LATIN-1

---	←	→	---
END	PAGE -	PAGE +	---

 ▲ ▼

→

7.2.1 Basic Operation

How to Select the Item

Turn the roller to select the item to be changed.

The selected item will be displayed in reverse image.

How to Change the Setting

Press either FIXATION switch, LIMITER switch, START switch or PRINT switch.

The selected setting will be highlighted.

NOTE: Some settings must be changed in different ways. The procedure for changing those settings will be indicated under the explanation of each item.

7.2.2 Items

PRINT	Whether to print out the results with the internal printer of the TX-F
“ON”:	Results are printed.
“OFF”:	Not printed.
[DATA]	Results to be printed/transferred.
“STD”:	Standard values
“MEM”:	10 newest measurements and a standard value for each eye in memory

NOTE: Regardless of the setting, data in memory will be printed/ transferred if the PRINT switch is pressed more than two seconds.

[MSG]	Whether to print the messages entered in section 7.3 with the result “ON”: Message is printed. “OFF”: Message is not printed.
[ECO]	Whether to reduce the size of the printout “ON”: Size of printout will be reduced. “OFF”: Non-reduction

[How to change the setting]

Press either START switch or PRINT switch.

TRANS	Whether to transfer the measurement data to external instrument or not <i>NOTE: Please contact Canon representative or distributor when connecting external instrument to the TX-F.</i> “ON”: Data is output in RS232C interface. “OFF”: For no transfer.
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[FMT]	Transfer format <i>NOTE: For details concerning format, please contact Canon representative or distributor.</i>
-------	--


[How to change the setting]

Press either START switch or PRINT switch.

[BAU]	RS232C data transfer speed and data format 9600.8N1 9600: Transfer speed “300/600/1200/2400/4800/9600/19200” 8: Transfer bit “7/8” N: Parity “E/O/N” 1: Stop bit “1/2”
-------	---

[How to change the setting]

- (1) Turn the roller or press FIXATION switch or LIMITER switch to select transfer speed or transfer format.
- (2) Press either START switch or PRINT switch to change the setting.

AUTO PRINT	<p>Whether to automatically have the results of measuring both eyes printed out in FULL AUTO mode</p> <p>“ON”: Results will be printed out automatically.</p> <p>“OFF”: PRINT switch must be pressed to print out the results. When “PRINT” and “TRANS” are set to “OFF”, “AUTO PRINT” will also be set to “OFF”.</p>
DEFAULT	<p>Choosing whether to automatically return to AUTO mode or FULL AUTO mode in the following cases:</p> <ul style="list-style-type: none">- After power is turned ON- After pressing PRINT switch- After deleting data by pressing CLEAR (DEMO) switch- After recovering from power-saving mode <p>“AUTO”: The instrument returns to AUTO mode.</p> <p>“FULL AUTO”: The instrument returns to FULL AUTO mode.</p>
() LEVEL	<p>Choosing whether to display level meter on the measurement mode screen, display mode screen and printout.</p> <p>Level meter is a mark showing the waveform level of the signal obtained by detecting light reflected from the cornea when air is blown onto the eye.</p> <p>“ON”: Level meter will be displayed.</p> <p>“OFF”: Level meter will not be displayed.</p>
CHARACTER	<p>The type of characters displayed for entering message on page 3/3 can be selected. See the illustration of the monitor in section 7.3.</p> <p>“JIS”: Japanese characters will be displayed.</p> <p>“LATIN-1”: Characters such as with umlaut will be displayed.</p>

Press AUTO/MANU. switch to proceed to page 3/3.

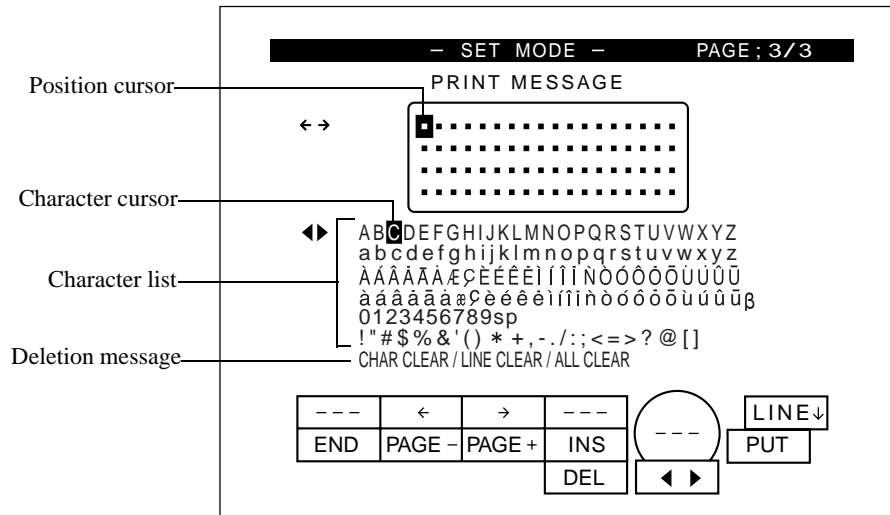
Press PUFF TIMES switch to return to page 1/3.

Press CLEAR (DEMO) switch to return to measurement mode.

7.3 Entering Message for Internal Printer (Page: 3/3)

Enter a message to be printed out with the result of measurement with the internal printer.
You can enter messages in 18 characters × 4 lines.

Message is backed up by battery, and will be retained even if power is turned OFF.



7.3.1 About the Display

- Position cursor:** Square in the message entering area is called a position cursor. Input will be made at the place where the cursor is located. Position cursor moves to left by pressing FIXATION switch, and to right by pressing LIMITER switch.
- Character cursor:** Square in the character list or deletion message is called a character cursor. Character being selected with character cursor will be entered. Or, deletion operation can be selected with the character cursor in the deletion message. Character cursor moves to right or left by turning the roller.
- Character list:** A list of characters that can be entered is displayed here. Line that includes the required characters can be selected by pressing PRINT switch. Character can be selected by turning the roller.
- Deletion message:** For details, see section 7.3.4.

7.3.2 How to Enter the Characters

1 Move the position cursor to the required position

Press FIXATION switch or LIMITER switch.

2 Select the required character

Press PRINT switch to select the line that includes the required character. Then, turn the roller to select the character.

3 Enter the character

Press START switch.

4 Enter the whole message

Repeat the steps from 2 to 3 until the whole message is entered.

7.3.3 How to Insert

1 Move the position cursor to the required position

Press FIXATION switch or LIMITER switch.

2 Insert a space

Press CHIN REST ↑ switch. A space of one character will be inserted at the place where the cursor was.

3 Enter the character

Repeat the steps 2 and 3 in section 7.3.2.

7.3.4 How to Delete

In order to delete single character and shift all the characters on the right-hand side to the left by one space

1 Move the position cursor to the character to be deleted

Press FIXATION switch or LIMITER switch.

2 Delete the character

Press CHIN REST ↓ switch.

In order to delete single character without shifting the remaining characters

1 Move the position cursor to the character to be deleted

Press FIXATION switch or LIMITER switch.

2 Select the line “CHAR CLEAR / LINE CLEAR / ALL CLEAR”

Press PRINT switch.

3 Select “CHAR CLEAR”

“CHAR CLEAR” is first selected. However, if you have changed the selection, turn the roller until “CHAR CLEAR” is displayed in reverse image.

4 Delete the character

Press START switch.

In order to delete a line

1 Move the position cursor to the line you wish to delete

Press FIXATION switch or LIMITER switch.

2 Select the line "CHAR CLEAR / LINE CLEAR / ALL CLEAR"

Press PRINT switch.

3 Select "LINE CLEAR"

Turn the roller until "LINE CLEAR" is displayed in reversed image.

4 Delete a line

Press START switch.

Following message will be displayed for confirmation:

"DELETE A LINE?"

If it is OK to delete the line, press START switch.

If you wish to cancel the deletion, press PRINT switch.

In order to delete the whole message

1 Move the position cursor to the line you wish to delete

Press FIXATION switch or LIMITER switch.

2 Select the line "CHAR CLEAR / LINE CLEAR / ALL CLEAR"

Press PRINT switch.

3 Select "ALL CLEAR"

Turn the roller until "ALL CLEAR" is displayed in reversed image.

4 Delete the whole message

Press START switch.

Following message will be displayed for confirmation:

"DELETE ALL DATA?"

If it is OK to delete the whole message, press START switch.


If you wish to cancel the deletion, press PRINT switch.

Press AUTO/MANU. switch to proceed to page 1/3.

Press PUFF TIMES switch to return to page 2/3.

Press CLEAR (DEMO) switch to return to measurement mode.


8. Daily Inspection and Maintenance

 CAUTION	For safety reasons, be sure to inspect the instrument daily before using it.
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8.1 Inspection

In order to ensure that the instrument is used safely and normally, please be sure to inspect the instrument before use.

If any problem is found during the inspection, please take measures indicated in this chapter. If problem still cannot be corrected, please contact Canon representative or distributor.

 WARNING	The instrument must be repaired by a qualified engineer only. If it is not repaired properly, it may cause fire, electric shock, or accident.
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8.1.1 Before Turning ON the Power

 WARNING	For safety reasons, be sure to turn OFF the power switch when the following inspections are going to be performed. Otherwise, it may result in electric shock.
 WARNING	Clean the plug of the power cable periodically by unplugging it from the AC outlet and removing dust or dirt from the plug, its periphery and AC outlet with a dry cloth. If the cable is kept plugged in for a long time in a dusty, humid or sooty place, dust around the plug will attract moisture, and this could cause insulation failure which could result in a fire.

It is recommended that a record of the inspection be kept by copying this and the next page, or making a separate check list.

	Inspection	Result			Remedy
		Date /	Date /	Date /	
Cable	(1) Check that cable is not damaged or cover of cable is not torn.	Good/ Bad	Good/ Bad	Good/ Bad	Contact Canon or distributor if there is any problem.
	(2) Check that the power cable is inserted fully into the connector on the instrument and into the AC receptacle.	Good/ Bad	Good/ Bad	Good/ Bad	Fully insert the cable.

	Inspection	Result			Remedy
		Date /	Date /	Date /	
Main Unit	(3) Check that the cover or parts are not damaged and not loose.	Good/ Bad	Good/ Bad	Good/ Bad	Contact Canon or distributor if there is any problem.
	(4) Clean the nozzle and objective lens.	Good/ Bad	Good/ Bad	Good/ Bad	See sections 8.3.1 and 8.3.2.
	(5) Disinfect the forehead rest.	Good/ Bad	Good/ Bad	Good/ Bad	See section 8.3.3.
	(6) Check that there are enough sheets of chin rest paper on the chin rest.	Good/ Bad	Good/ Bad	Good/ Bad	Obtain paper if not enough. See section 8.4.1.
	(7) Check that there is enough printing paper left.	Good/ Bad	Good/ Bad	Good/ Bad	If not, replace the roll of paper. See section 8.4.2.
	(8) Check that the monitor is clean.	Good/ Bad	Good/ Bad	Good/ Bad	Clean the monitor. See section 8.3.4.

8.1.2 After Turning ON the Power

	Inspection	Result			Remedy
		Date /	Date /	Date /	
Main Unit	(1) Check that the READY lamp lights and measurement display on the monitor is normal.	Good/ Bad	Good/ Bad	Good/ Bad	Contact Canon or distributor if there is any problem.
	(2) Check that the chin rest moves up and down smoothly when CHIN REST switches are pressed.	Good/ Bad	Good/ Bad	Good/ Bad	
	(3) Check that the measurement head moves up and down, right and left when the trackball is turned.	Good/ Bad	Good/ Bad	Good/ Bad	
	(4) Check that the measurement head moves back and forth when the roller is turned.	Good/ Bad	Good/ Bad	Good/ Bad	
	(5) Check that the measurement head moves properly when R/L switch is pressed.	Good/ Bad	Good/ Bad	Good/ Bad	
	(6) Check that air is puffed when CLEAR(DEMO) switch is pressed for more than two seconds.	Good/ Bad	Good/ Bad	Good/ Bad	

8.2 Before Calling a Service Person

Whenever a problem occurs or message appears on the monitor, take the countermeasures indicated below according to the cause.

If function is still not restored, contact Canon representative or distributor.

8.2.1 If Problems Such as Following Occur

Problem	Cause	Remedy
Measurements vary widely.	Eyelid or eyelashes are covering the pupil.	Instruct the examinee to open the eye wider, or lift up the eyelid lightly with your fingers and measure again.
	Examinee's eye is not fixed. (Eye is moving restlessly.)	Relax the examinee and have him/her look at the eye fixation lamp.
	Examinee's eye is exposed to external light.	Do not expose the examinee's eye directly to bright artificial light or sunlight.
Level meter is low.	Eyelid or eyelashes are covering the pupil.	Instruct the examinee to open the eye wider, or lift up the eyelid lightly with your fingers and measure again.
	Frequent blinking.	Tell the examinee to try not to blink, or lift up the eyelid lightly with your fingers and measure again.
	The reflection rate of the cornea is low.	Level meter will not be high in this case. Continue the measurement.
Settings in the SET mode have changed for no apparent reason. When power is turned OFF and then ON again, message "LOW BATTERY" appears on the monitor.	Voltage of battery for data backup is low.	Contact Canon or distributor for replacement of battery.
READY lamp blinks and nothing is displayed on the monitor.	Power-saving system is functioning because no operation has been performed for over 3 minutes.	Press any switch.

8.2.2 If Message Such as Following Appears on the Monitor

If message does not disappear even after taking the countermeasures indicated in this section, contact Canon representative or distributor.

	Message / Display	Cause	Remedy
During automatic alignment	[1] EYE CANNOT BE FOUND PRESS START SW AGAIN	The position of examinee's eye is off the automatic alignment range.	Use the roller and trackball to move the position of the examinee's eye on the monitor toward the center a little more and press the START switch again.
		Examinee's eye is moving restlessly.	Have the examinee look at the eye fixation lamp and press the START switch again. Or, if two bright dots are displayed on the monitor, measurement will be performed if the START switch is pressed timely during alignment. However, measurement error will occur if the positioning is not accurate.
		The pupil is obscured by eye-lashes or eyelid.	Instruct the examinee to keep his/her eye open wide, or help them open the eye widely by lifting up the upper eyelid lightly with your fingers. Then, press the START switch again.
		Pupil is eccentric or deformed.	Use the roller and trackball to move the position of the examinee's eye on the monitor toward the center a little more and press the START switch again.
		The center of the pupil could not be found due to effect of surgery, etc.	Measure the eye manually.
		Problem in surface of cornea.	Measure the eye manually. However, error may occur even in MANUAL mode if the disease is serious.
		Effect of external light.	Do not expose the examinee's eye directly to bright artificial light or sunlight.
	[10] CANCELLED BY USER	The examiner has cancelled the automatic measurement by pressing one of the switches, or measurement error has occurred.	Press START switch again as required.

	Message / Display	Cause	Remedy
During automatic alignment	[20] LEFT LIMIT CHECK POSITION OF FACE	The measurement head has reached the mechanical limit during alignment.	Check the height of the chin rest, ensure that the examinee's face is properly positioned, and press the START switch again.
	[21] RIGHT LIMIT CHECK POSITION OF FACE		
	[22] FRONT LIMIT CHECK POSITION OF FACE		Check the position of the chin rest, ensure that the examinee's face is properly positioned, and press the START switch again.
	[23] BACK LIMIT CHECK POSITION OF FACE		
	[24] UPPER LIMIT CHECK POSITION OF FACE		
	[25] LOWER LIMIT CHECK POSITION OF FACE		
	[26] LIMITER POSITION RE-SET LIMITER POSITION	Focusing cannot be performed because the nozzle has reached the measurement head stop position and cannot go nearer to the examinee's eye during automatic alignment.	Check that the examinee's face is properly fixed, and set the measurement head stop position with LIMITER switch again.
	MOTOR ERROR 1 (2 / 3) PRESS ANY SW TO RESET	Movement of measurement head has been interrupted.	Do not interrupt the movement of the measurement head such as by holding it. Press any switch to reset the measurement head.
During measurement	[2] ERROR TRY AGAIN	The pupil is obscured by eye-lashes.	Instruct the examinee to keep his/her eye open wide, or help them open the eye widely by lifting up the upper eyelid lightly with your fingers. Then, measure again.
		The examinee's eye moved just before the measurement.	Ask the examinee not to move his/her eye and measure again.
		Reflection of the examinee's eye is low.	Measure again.
		Effect of external light.	Do not expose the examinee's eye directly to bright artificial light or sunlight.
	[3] BLINK ERROR TRY AGAIN	Measurement error has occurred because the examinee blinked or examinee's eye moved.	Ask the examinee not to blink and not to move his/her eye. Then, press the START switch again.

	Message / Display	Cause	Remedy
During measurement	[4] OVER ERROR TRY AGAIN	Result was over the measurement range (30mmHg/60mmHg).	<p>[When "30" is selected for "RANGE" in SET mode] Press the START switch again as the range will automatically switch to "60". Measurement range will return to "30" if the result of measurement is under 25 mmHg, or if R/L switch, PRINT switch or CLEAR (DEMO) switch is pressed.</p> <p>[When "60" is selected for "RANGE" in SET mode] Press the START switch again. If the error still appears, it means measurement cannot be made with the TX-F as the pressure of the examinee's eye is higher than 60 mmHg.</p>
	[5] IOP > (<) = xx* mmHg! ONE MORE -> START SW NEXT EYE -> R/L SW (END -> PRINT SW)	<p>The result was over (under) the value set from "WARNING IOP" in SET mode.</p> <p>* xx: Value set in SET mode</p>	Press START switch to measure again. Measurement will be performed once each time the switch is pressed. After the measurement, press R/L switch to measure the other eye. Or, if the other eye has already been measured, press PRINT switch to print out the result.
	[6] WARNING IMAGE TRY AGAIN	The pupil is obscured by eye-lashes.	Check the image and instruct the examinee to keep his/her eye open wide, or help them open the eye widely by lifting up the upper eyelid lightly with your fingers. Then, measure again.
		The examinee's eye moved just before the measurement.	Check the image and ask the examinee not to move his/her eye. Then, measure again.
	[11] STOPPED BY USER	The movement of measurement head has been cancelled because the examiner has pressed one of the switches when the measurement head was moving to the other side, or during initialization.	Press R/L switch again as required.
	[12] CHARGING	Examinee pressed the START switch to measure the eye forcibly during automatic alignment, but the measurement failed because the instrument was not charged.	Check that the READY lamp is lit, and measure again.

	Message / Display	Cause	Remedy
During measurement	*	Reliability has been determined to be low after multiple measurement data have been analyzed. The cause of the low reliability may be: (1) Eye has moved. (2) Reflection rate of examinee's eye is low.	Measure again.
During printing	PRINT CANCELLED	Printing has been cancelled by pressing one of the switches during printing.	Perform printing again as required.
	NO PRINT DATA	There is no measurement data.	Print after measurement.
	PRINT: OFF	"PRINT" is set to "OFF" in SET mode.	Set "PRINT" to "ON" as required.
	PRINT: OFF / TRANS: OFF	Both "PRINT" and "TRANS" are set to "OFF" in SET mode.	Set them to "ON" as required.
	PRINTER LEVER IS DOWN	Printer lever is lowered.	Raise the lever.
	NO PRINT PAPER	There is no printing paper.	Load role of printing paper.
	PRINTER TOO HOT	The printer head is too hot.	Wait for about 5 minutes and try again.
	PRINTER TOO COLD	The printer head is too cold.	
During transfer	TRANSMITTING	Data is being transmitted.	-----
	TRANS COMPLETED	Data transfer has been completed.	-----
	NO TRANS DATA	There is no measurement data.	Transfer after performing measurement.
	TRANSMISSION CANCELLED	Transmission has been cancelled by pressing one of the switches during transfer.	Transfer again as required.
	RECEIVED BREAK CHARACTER	The instrument has received a break character from the external equipment.	Transfer again as required.
	COMMUNICATION ERROR (401)	The connected equipment is not ready yet or not connected.	Prepare the external equipment.
	COMMUNICATION ERROR (402) - (410)	Format set in SET mode and that of the external equipment do not match.	Change the settings as required.

	Message / Display	Cause	Remedy
Error in the system	LOST BACKUP DATA	Problem has occurred in the instrument.	Although you can continue the measurement for time being, the data cannot be backed up. Immediately ask Canon or distributor for replacement.
	LOST DATE DATA		
	LOW BATTERY	Voltage of the battery for data backup is low.	Although you can continue the measurement for time being, the data that are backed up will be lost in time. Immediately ask Canon or distributor for replacement.
	SYSTEM ERROR (xxx*)	Problem has occurred in the instrument.	Turn OFF the power switch and turn it ON again after about 10 seconds.
	ILLEGAL CODE ERROR	Problem has occurred in the instrument.	Turn OFF the power switch and turn it ON again after about 10 seconds.
	ILLEGAL SLOT ERROR		
	CPU ADDRESS ERROR		
	DMAC ADDRESS ERROR		

* xxx indicates a three-digit number.

8.3 Cleaning and Disinfection

8.3.1 Nozzle

When dust is on or inside the nozzle, press CLEAR (DEMO) switch for more than two seconds to blow it off.

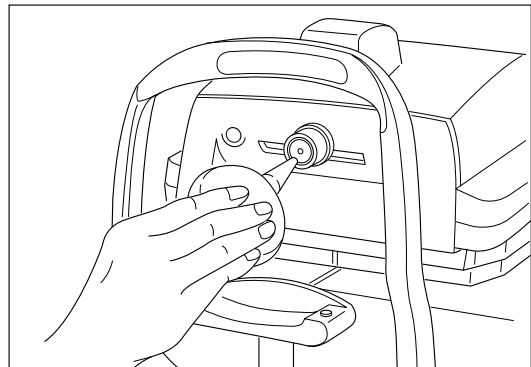
8.3.2 Objective Lens of Nozzle

Clean the objective lens of nozzle as indicated below when dust is on it, or if it is stained with tears.

- NOTES:*
- 1. If the objective lens is wiped when there is dust on it, the surface will be scratched.*
 - 2. Do not wipe the objective lens with disinfecting alcohol or cleaning paper containing silicone as the surface may be damaged or be stained.*
 - 3. Do not touch the nozzle during cleaning as lint of gauze, etc. may attach to it.*
 - 4. Be sure to put the cap over the nozzle when the instrument is not in use.*

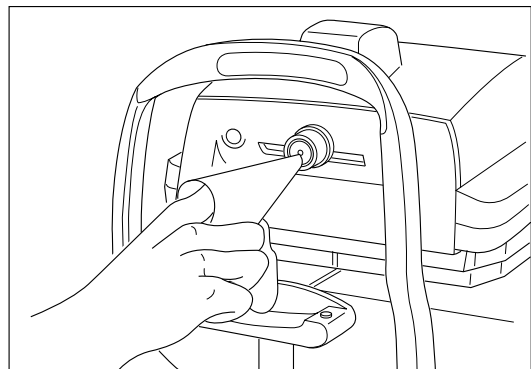
1 Blow off dust

Remove the brush from the blower brush and blow off the dust on the objective lens.




2 Wipe the objective lens

Wipe the objective lens lightly with sterile gauze or non treated lens paper, on which you can put some lens cleaner. Please consult Canon representative or distributor about lens cleaners that can be used.




8.3.3 Forehead Rest

 CAUTION	<p>Wipe the forehead rest with ethanol or glutaraldehyde solution to disinfect it each time a different examinee uses it, in order to prevent infection.</p> <p>Please contact a specialist for the procedure for disinfection. If you are using disinfectant other than those specified above, or if you are mixing another disinfectant with ethanol, please also consult a specialist, because they may harm the forehead rest.</p>
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8.3.4 Cover, Monitor and Roller

Clean the cover and monitor if they are dirty.

 WARNING	<p>When the instrument is going to be cleaned, be sure to turn OFF the power switch and unplug the power cable from the AC outlet. Never use alcohol, benzine, thinner or any other flammable cleaning agents. Otherwise, fire or electric shock may result.</p>
--	--

1 Turn OFF the power

Turn OFF the power switch and disconnect the power cable from AC receptacle.

2 Wipe the cover and monitor

- (1) Wipe the cover and monitor with a piece of soft cloth soaked in neutral detergent for plastics diluted in water and wrung dry.
- (2) Wipe the cover with a piece of cloth soaked in water and wrung dry whenever neutral detergent has been used.

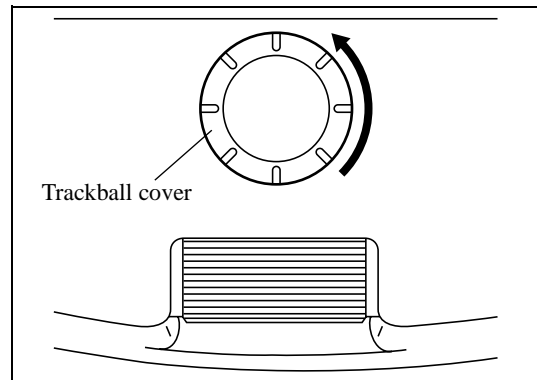
8.3.5 Trackball

Clean the trackball if it does not rotate smoothly.

1 Remove the trackball cover

Turn the trackball cover in counter-clockwise direction to remove it.

NOTE: Trackball cover will be removed with the trackball. Be careful not to hit or drop the trackball cover when the trackball is attached to it, as the trackball will fall out easily.



2 Remove the trackball and wash it

Remove the trackball from the claws of the trackball cover and wash it in water.

3 Wipe the roller and trackball cover

There are three rollers inside the hole where trackball was placed. Wipe those rollers and the back of trackball cover with a piece of cloth soaked in water and wrung dry.

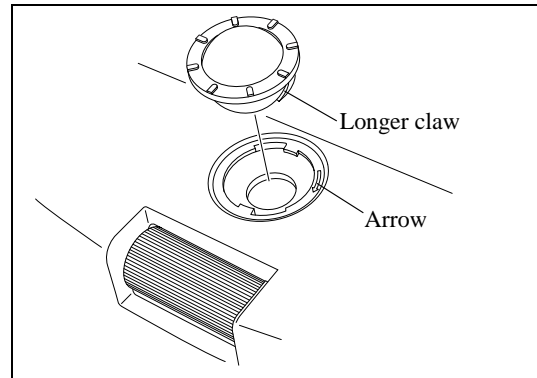
4 Return the trackball

After the trackball and other parts that have been wiped are dry, return the trackball to the trackball cover.

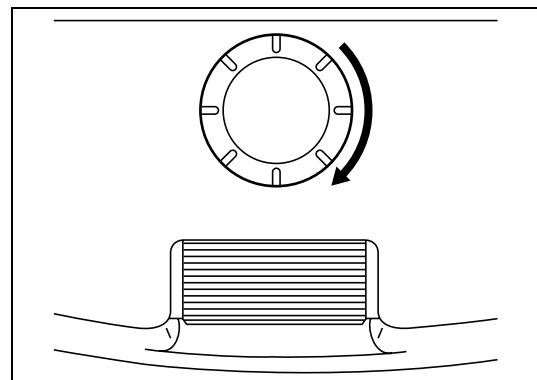
5 Attach the cover

Return the trackball cover by aligning the longer claw of the cover with the arrow indicated on the edge of the aperture.

NOTE: Cover will not fit into the hole unless the longer claw is properly aligned with the arrow.



Then, turn the cover in clockwise direction until it stops.



8.4 Replacement

Please refer to “8.5 Expendable Parts List” for ordering chin rest paper and printing paper.

8.4.1 Chin Rest Paper

NOTE: When chin rest paper is not going to be used, disinfect the chin rest in the same ways as disinfecting the forehead rest each time the examinee changes.

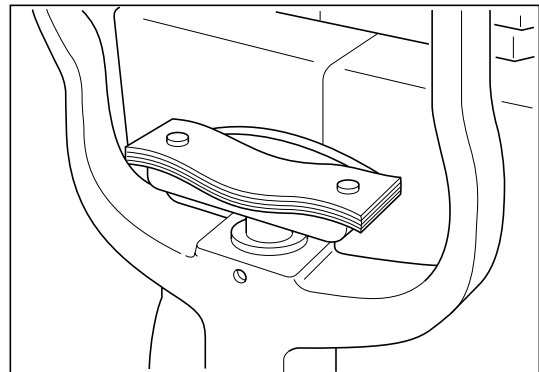
1 Pull out the two pins on the chin rest

2 Insert the pins into the holes on the chin rest paper

Maximum of 100 sheets of paper can be attached.

3 Replace them in the chin rest

NOTE: Insert the pins straight into the holes.

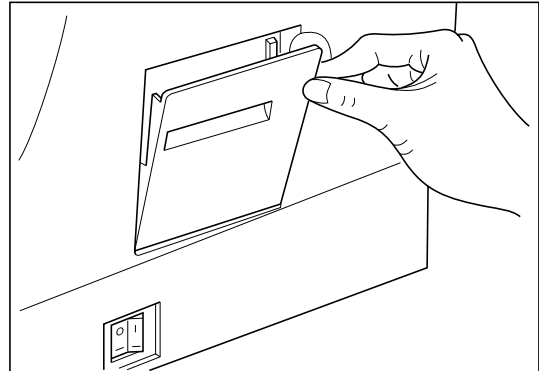


8.4.2 Printing Paper

Replace the roll of printing paper as soon as possible after the red line appears on the paper.

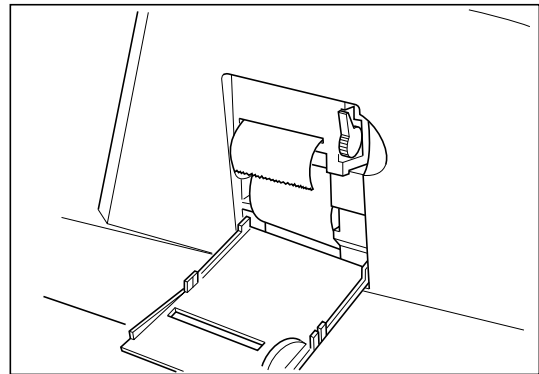
1 Open the printer cover

Cut off the paper that has been fed through the printer and pull it out.
Pull the top part toward you.



2 Lower the printer lever

Lower the lever on the right hand side.



3 Remove the old roll of paper

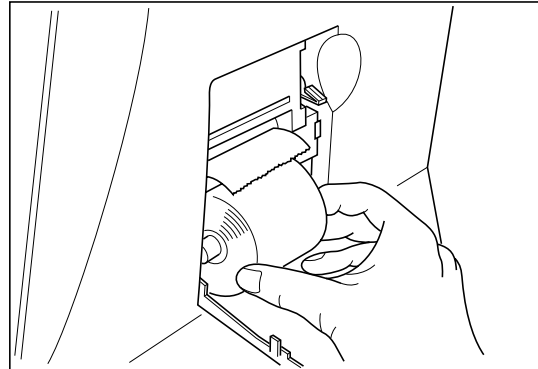
Remove the old roll of paper together with the shaft and take the shaft out of the roll.

4 Insert the shaft into a new roll

5 Load the roll of paper

Load the roll of paper into the printer as illustrated.

NOTE: Be sure to check that the direction of roll is the same as shown in the illustration.



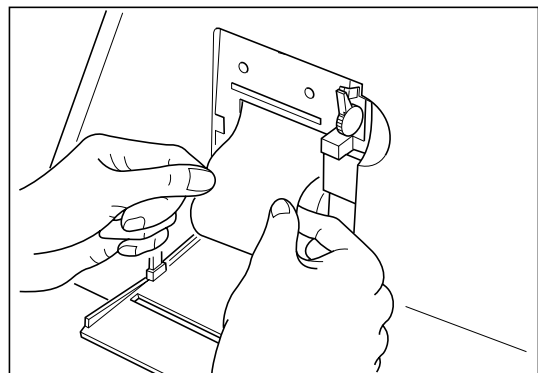
6 Raise the printer lever

7 Turn ON the power

Turn ON the power of the TX-F.

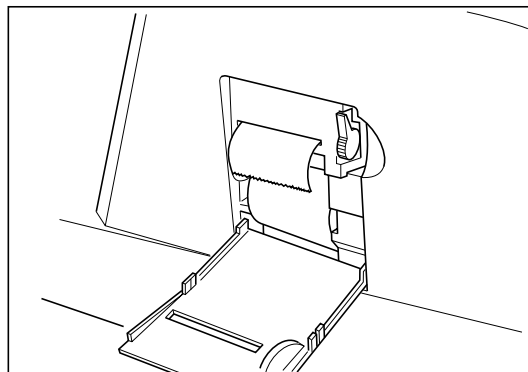
8 Insert the end of paper into the slot

Insert the end of paper into the slot in the printer.



9 The paper will automatically come out

If the power is ON, the end of paper will automatically come out from the slot in the front.



NOTES: 1. *If the edge of paper is creased, it may not feed through printer properly. In this case, pull out the paper, neatly cut off the end of paper and reload.*
 2. *If the paper is fed through the printer aslant, it may cause paper jam. Lower the lever and straighten the paper. Then, raise the lever again.*

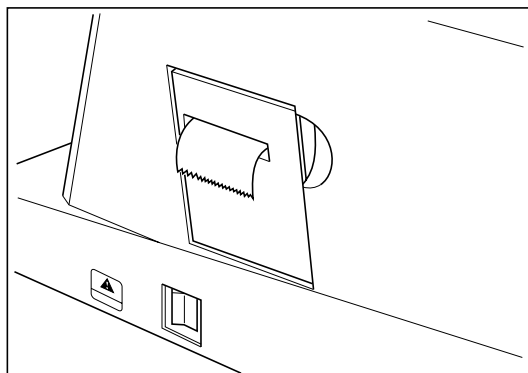
10 Close the cover



CAUTION

Do not touch the cutter for the printing paper. Otherwise, fingers may be cut.

Pull out the edge of paper from the printer cover slot and close the cover.






8.5 Expendable Parts List

Please contact Canon representative or distributor for purchasing the following parts:

Name	Reference Number	Note
Chin rest paper	BA3-0151	500 sheets/set
Printing paper	BH4-8143	Thermal printing paper 10 rolls/set Width: 58 mm Length: 30 m Outside diameter of the roll: 52 mm Inside diameter of the core: 12 mm

9. Installation

9.1 Installation

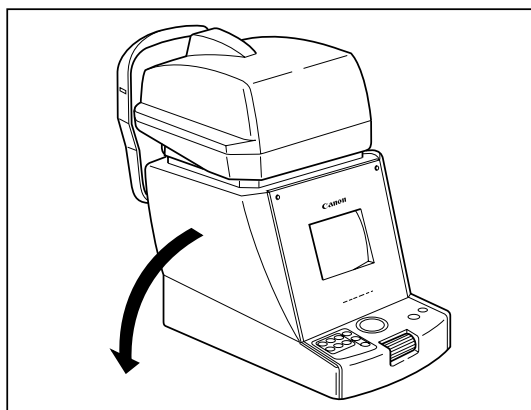
 WARNING	Only operate the instrument with the type of power supply indicated on the rating label. Otherwise, it may result in fire or electric shock.
 WARNING	Be sure to disconnect/connect the cables as indicated in this manual. The unit weighs 21 kg, so bear in mind that it may tip over if proper care is not taken. Also, do not handle the cables with wet hands. Otherwise, you may get an electric shock that may result in death or serious injury.
 CAUTION	This instrument is shipped with a grounding type (three-core) power cable. To reduce the risk of electric shock, always plug the cable into a grounded power outlet.

NOTE: Do not install the instrument in a location with the conditions listed on page (2).

1 Turn OFF the power switch

2 Expose the bottom of the instrument

Lay the instrument on its side on a table as illustrated so the bottom can be seen.



- NOTES:*
- 1. The measurement head is positioned at the center when the instrument is shipped from Canon. However, if it is positioned either on the right or left side, lay the instrument on the side opposite the side from which the measurement head is protruding. Otherwise, the measurement head will be damaged.*
 - 2. Do not lay the instrument on its side with the power turned ON. Otherwise, the instrument may malfunction.*

3 Connect the power supply cable to the instrument

Hold the instrument firmly with your hand and securely connect the power supply cable to the power supply connector on the bottom of the instrument. See section 3.2.

4 Set up the instrument

5 Connect the power supply cable to an AC outlet

6 Place the chin rest paper on the chin rest

See section 8.4.1.

7 Load the printing

See section 8.4.2.



8 Customize the settings as required

Turn ON the power and change the settings concerning the measurement as required. See chapter 7.

9 If you are using external equipment

Please contact Canon representative or distributor.

9.2 Precautions when Moving the Instrument

 WARNING	<p>When the instrument is going to be moved, be sure to move the measurement head to the center, turn OFF the power switch, unplug the power cable from the AC outlet, and disconnect other cables. Otherwise, the cable may be damaged, which may result in fire or electric shock.</p> <p>Also, when the instrument is going to be carried, support the bottom of the instrument and hold it horizontally.</p> <p>Do not hold it by the face rest or other parts as they may come off, resulting in injury.</p>
 WARNING	<p>Do not hit or drop the instrument. The instrument may be damaged if it receives a strong jolt, which may result in fire or electric shock if the instrument is used without being repaired.</p>

NOTE: When the instrument is going to be transported by automobile, etc., it must be protected against vibration and shocks. Contact Canon representative or distributor for advice on the procedure for packing it.

1 Move the measurement head to the center

Turn ON the power while pressing the START switch.
Release the switch when you hear a beeping sound.

2 Turn OFF the power

Turn OFF the power switch.

3 Disconnect the cables

Lay the instrument in the same position as when connecting the power cable (see section 9.1). After disconnecting all the cables, set the instrument upright again.

4 Carrying the instrument

Support the instrument by holding the sides at the base.

10. Service Information

Repair

If problem cannot be solved even after taking the measures indicated in sections 8.1 and 8.2, contact Canon representative or distributor for repair.

Please refer to the rating plate and let us have the following information:

Name of the instrument: TX-F

Serial number of the instrument: 6-digit number indicated on the rating plate

Phenomenon: In detail.

Limit for Supplying Performance Parts for Repair

Performance parts* of this product will be stocked for eight years after discontinuance of production, to allow for repair.

* Parts required to maintain the functioning of the product.

Expendable Parts Replaced by Service Person

Following parts are apt to become worn out or to deteriorate due to the characteristics of the material or structure.

These parts cannot be replaced by the user.

If these parts are found to be worn out or to have deteriorated during daily inspection or use, contact Canon representative or distributor for repair.

– Backup batteries for the clock and data

Disposal of the Instrument



CAUTION

This instrument incorporates a lithium battery, which may pollute the environment if the instrument is abandoned.

Please ask a professional waste disposal company to handle disposal, or contact Canon representative or distributor before disposing of the instrument.

11. Specifications

Purpose	Measurement of intraocular pressure of human eye
Type	Non-contact type
Measurable range	0 to 60 mmHg (0 to 30 mmHg / 25 to 60 mmHg changes automatically)
Measuring increment	1 mmHg
Operation distance	Approximately 11 mm from front of nozzle
Measurement mode	Fully automatic, automatic and manual modes
Measurement accuracy	ISO standard: Percentage of measurements out of tolerable range must be under 5%.

Range	Number of measured eyes	Number of measurements out of tolerable range	Percentage of measurements out of tolerable range
16mmHg>GAT≥7mmHg	298	6	2.0%
23mmHg>GAT>16mmHg	198	6	3.0%
GAT≥23mmHg	42	2	4.8%
Total	538	14	2.6%

Data of some eyes have been excluded from the above data due to following reasons:

Phthisis bulbi (1 eye), corneal erosion (1 eye), unstable stare (1 eye), keratitis (1 eye), too many blinks (31 eyes)

Regression and correlation:

	Regression Slope	Regression Intercept	Coefficient of Correlation
TX-F (Compared with Applanation Tonometer)	0.933	1.721	0.882

Observation range	Approximately 15 mm × 12 mm
Memory	Maximum of 10 measurements for each eye
Printer	Thermal line printer
Data output format	RS232C

Display	5-inch monochrome monitor
Environmental requirements	Operation: Temperature: 10 to 40°C Humidity: 30 to 85%RH Storage and Transportation: Temperature: -10 to 55 °C Humidity: 10 to 95%RH Atmospheric pressure: 700 to 1060 hPa
Power supply	100 - 240 VAC, 50/60 Hz, 0.8 - 0.4A
Power consumption	80 VA
Dimensions	280 (W) × 520 (L) × 480 ± 15 (H) mm
Mass	Approximately 21 kg

NOTE: According to the International System of Units, 1 mmHg is approximately 0.133 kPa.

12. Components

TX-F main unit.....	1
Power supply cable.....	1
Nozzle cap	1
Chin rest paper.....	100 sheets
Printing paper	4 rolls
Dust cover.....	1

Optional Accessories

Chin rest paper (500 sheets)
Printing paper (10 rolls)
Motorized table CO-MT



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